# REPORT RESUMES

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AN ANALYSIS OF SELECTED BUSINESS AND TECHNOLOGY PROGRAMS IN HIGH SCHOOLS AND IN TWO-YEAR COLLEGES AND INSTITUTES OF NEW YORK STATE WITH A VIEW TOWARD INITIATING ARTICULATION PROCEDURES IN COUNTERPART OFFERINGS.

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A RESEARCH CONFERENCE ON VOCATIONAL AND TECHNICAL EDUCATION WAS HELD TO BRING HIGH SCHOOL AND 2-YEAR COLLEGE REPRESENTATIVES TOGETHER TO DISCUSS MUTUAL PROBLEMS OF COORDINATION. THE PRIME CONCERN WAS TO IDENTIFY AND SUGGEST WAYS FOR DEVELOPING TECHNIQUES IN ARTICULATION OF THE OFFERINGS IN BUSINESS, MECHANICAL, AND ELECTRIAL TECHNOLOGIES. THE ORGANIZATIONAL FRAMEWORK PROVIDED FOR THE IDENTIFICATION OF ISSUES RELATING TO THE THREE BROAD AREAS OF VOCATIONAL AND TECHNICAL EDUCATION, CURRICULUM, AND STUDENT. PAPERS WERE PRESENTED DEALING WITH ALL THREE SUBJECT AREAS. FOLLOWING EACH OF THE MAJOR PRESENTATIONS, CONFERENCE PARTICIPANTS MET IN GROUPS TO DEVELOP RECOMMENDATIONS FOR ARTICULATION IMPROVEMENT. ALL FEDERAL FUNDS FOR THIS RESEARCH WERE SUBCONTRACTED THROUGH THE BUREAU OF OCCUPATIONAL EDUCATION, NEW YORK DEPARTMENT OF EDUCATION. (GD)

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FINAL REPORT
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February 1967

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Michael Brick

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Center for Urban Education

New York, New York

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# INTRODUCTION

One of the many pressing issues facing educators today is the place of vocational and technical education in our schools and colleges. There is a general lack of understanding of technical education among young people and among parents; and there is a need for better coordination between high schools, colleges, and industries.

The Center for Urban Education contracted with the New York State Department of Education to conduct a project which would result in a conference to bring high school and two year college representatives together to discuss mutual problems. A prime concern was to identify and suggest ways for developing techniques for working together, particularly in the articulation of the program offerings in the business, mechanical and electrical technologies.

Michael Brick, Research Associate for the Center for Urban Education and Associate Professor of Higher Education, Teachers College, Columbia University, was the project director. A research conference on vocational-technical education was held October 20-22, 1966 at the Greyston Conference Center in Riverdale, New York. Forty two invited delegates representing universities, the State Education Department, secondary schools and two year colleges concerned with business, electrical, and mechanical technology programs attended the conference.

Method—In order to collect data to supply to the participants in the work conference, a questionnaire was sent to community colleges and to a random selection of high schools in New York State. The purpose of the questionnaire was to collect data in regard to the following:

1. elements of curriculum content in secondary business education programs in secretarial and distributive education programs and technical courses in the mechanical and electrical area; to compare these elements of curriculum with counterpart curriculums in these subject areas in selected two-year colleges and to develop and determine areas of possible curriculum interrelationships.
2. present status of articulation between the two institutional levels.
3. types of students being served by the programs.

The conference was an invitational conference. Invitations were extended to persons representing the university, the high school, and the two year college. In addition representatives from the State Department of Education, the State University of New York, the Center for Urban Education, and the American Technical Education Society were invited.

The organizational framework of the conference provided for the identification of issues relating to three broad areas involving purposes of vocational-technical education, curriculum, and the student. Recognized authorities were asked to deal with each major area. Following each of the major presentations, conference participants formed discussion and reaction groups to consider, discuss, and evaluate the materials, suggestions, and ideas given to them by the speakers. The primary objective of the discussion group was to make recommendations to improve articulation of business and technological programs in high schools and two year colleges.

MB

# THE RESEARCH

# AN ANALYSIS OF SELECTED TECHNOLOGY PROGRAMS

by

Michael Brick

For some ten years now, since Sputnik I coursed across the heavens, the technician has been the man of the hour. It is no accident that junior colleges during the decade just past have concentrated on the development of educational programs to prepare technicians for industry. The demand has been greatest in this field; salaries for the graduates have been good, and the status of the worker engaged in space research has become attractive. But, after more than ten years of continually expanding effort on the part of community colleges, technical institutes, and university extension centers, the "technician gap" is estimated to be nearly 35,000 per year,[1] just for technicians in industry and engineering related fields.

Other programs are beginning to claim a share of the junior college's time. Business education actually enrolls more non-transfer students in junior colleges than any other field. Despite growing automation of the business office, never has the demand been greater than it is today for well qualified secretaries. Although bookkeeping as we used to know it is a declining field of employment, accounting, particularly machine accounting and business data programing are rapidly growing fields. Business management including sales, store management, advertising, and purchasing are also expanding areas of employment.

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[1] National Science Foundation. Scientists, Engineers, and Technicians in the 1960's, NSF 63-64, Washington, D.C., 1963.

Community colleges differ in their approach to the level of program they offer. Some community colleges choose to offer only engineering technician curriculums and sometimes these are established at a level of rigor more nearly commensurate with the academic abilities of an "engineering" student than with those of a "technician" student. Such procedures are regrettable, for technical jobs are "middle level" jobs of semiprofessional status. Community colleges should offer technical education programs at both the engineering technology level as well as programs which prepare industrial technicians who can work in production, testing, and maintenance.

The high schools are also offering programs in vocational and technical education. Many of the technical educators in the high schools feel there is a place both for this kind of education in the high school and in two year colleges. Advocates of technical education in the high school point out that these programs serve as an inducement for a great number of boys and girls to stay in school who might not be interested in a totally academic program, and would drop out. In addition, vocational programs give the high school boy and girl a tremendous start on the road toward being a skilled and desirable person available for employment. The high school educator indicates that ideally he would like to see some type of orientation program at the 10th year level, with specialization beginning at the 11th and 12th grades; and that the students continue their education for two years in appropriate programs offered by the community college.

In order for the work conference to have specific data for discussion and analysis, a questionnaire was sent to 37 two year colleges and 83 high schools in New York State. The latter were chosen at random from a list of all high schools in New York State. Thirty four two year colleges responded for a return of 92% and 38 high schools for a return of 46%.

The questionnaire was sent to the chairmen of the following departments: mechanical technology, electrical technology, and business technology. The latter was divided into distributive education and secretarial programs. The questionnaire attempted to find out what were the types of students being served, the type of entry occupation for which high school and community college programs prepare, the general objectives of each program, and suggestions for improvement of programs. In addition a question was addressed to administrators asking them to indicate what articulation practices now existed between high schools and two year colleges and asking for suggestions for improvement. (See Appendix A).

## MECHANICAL AND ELECTRICAL TECHNOLOGIES

The Mechanical Technology program within the community college prepares students for immediate employment at the technician level. Some institutions indicate that their program prepares students with a basic, broad-based, mechanical background necessary for entry occupations in the wide spectrum of mechanical fields. A few institutions indicate that their aim is to produce high level engineering technicians capable of working effectively with graduate engineers in research, design, and manufacturing. The various programs reflect the basic difference in thinking about technical education that exists among community colleges.

Specifically, some of the community college department chairmen indicate the following as objectives of their program:

> To train the student to think, speak, and perform like a technician or assistant to the professional. To equip him with the necessary skills so that he is able to perform in a competitive industrial society. To leave the program open ended so that his training may be extended or expanded. This does not imply that the programs are intended to transfer to the junior year of an engineering school. It does mean that the student is trainable beyond the two years.

> To train our students to a degree of efficiency so that they might find a place in industry. The program is geared in this direction with transfer to four year college secondary.

> Prepares students for careers in drafting and mechanical designing. Students learn basic skills in drafting, machine tools, machine and tool design, and metal technology along with technical mathematics and technical physics. General education courses, which complement the technical subjects, help students become responsible and culturally aware citizens.

Only one two year college stated that many high school students either are not properly prepared or do not have the ability to cope with the engineering technology programs. Therefore, that institution recently began a Design-Drafting Technology program under the mechanical department to meet the need of these applicants. This curriculum requires only one year of mathematics for entrance.

All of the 18 two year institutions that responded in regard to the mechanical program indicated that they required mathematics as a prerequisite to the program. Nine require two years of college preparatory mathematics; six require two and one half years of mathematics; two require three years; and one strongly recommends three and a half years. Eight have no science requirement; six require physics or chemistry; three require two years of science; and one strongly recommends physics. Fourteen institutions do not require any special test scores or special standing in the high school class for admission into the program; four have some specific requirement. One college, for example, requires a minimum high school average of 70; another uses the SUNY Admissions test and requires a minimum score of 150 and the student to be in the upper 50% of the graduating class. A majority of the institutions indicate an open door approach to the program.

None of the two year colleges identify the students in the program as being above average in academic ability. Fifteen indicate that their students are of average ability; three characterize their students as below average.

In response to the question in regard to the background of the students in the program, the majority of institutions indicated that their students had taken academic or general programs in high school; a few reported that their programs included a cross section of students from academic, general, and vocational programs. One institution reported that their students generally took the path of least resistance in high school and that path was a vocational type program.

In answer to the question asking for information in regard to special aspects of the curriculum, the following answers were obtained:

> In the machine shop courses we are taking the emphasis off machine tools and covering the broad spectrum of manufacturing processes including casting, molding, forming, and welding. In the mechanical laboratory we plan to go into refrigeration, heat transfer, gas turbine. We are introducing numerical control of machine tools in the automation course.
>
> Our program is drafting and design oriented with liberal emphasis on English and the social sciences. Our program parallels the industrial atmosphere to as high a degree as possible. Our students learn to program numerical controlled machine tools and drafting equipment.
>
> Our programs emphasize extensive and rigorous labs used to strengthen theory and not as manipulative skill labs. Our machine tools labs are conducted on a "physics lab" approach with group experiments in force analysis, dynamometry and machinability and detailed lab reports. As far as I know, this is unique among two year schools. The courses are taught by graduate engineers and use an engineering-oriented approach.
>
> Our program is unique because we have geared our technical instruction fairly close in sequential order with the lab instruction. Group projects in third and fourth semesters are a good aid for leadership training as well as follower training. Versatility in methods and techniques enables the student to develop a good technical reasoning ability.

The entry job that the student is prepared for by the community college mechanical technology program varies widely. However, the two mentioned most often are engineering assistants and draftsmen. The others are sales, materials testing, machine design, quality control, technical writer, tool design, and junior metallurgist.

The department chairmen in the two year college mechanical technology programs overwhelmingly suggested that the high schools need to do a better job in mathematics and English in preparing the students coming into the program. They also recommended that the level of shop and drawing instruction be upgraded. One chairman indicated that it was "better to have no background than the misinformation often provided under the heading of vocational training." There was general agreement that high school counsellors should identify mechanically minded students, orient them towards mechanical technology as a fruitful field for study and then see to it that the student received proper mathematics and science preparation. In addition, the following specific comments were made by many of the department chairmen:

> Stop using the high-school technical programs as dumping grounds for poorer students and then assuring these students with a weak mathematics and strong hardware background that they are ready for a good technical college program.
>
> Elimination of the general diploma program.
>
> Guidance counselors, school administrators, parents and boards of education must be educated to the fact that career oriented programs are respectable. It should be understood that the technologies are not less respectable than engineering programs. It is important to realize that the difference in programs is one of objective.

## Electrical Technology Program

The information in regard to the electronics program in the community college pretty much parallels that of the mechanical technology programs. The 17 programs examined indicate that there is an emphasis on preparation in mathematics and physics as a requirement for admission into the program. The students are described as average and in the main have an academic background rather than a vocational background when they come into the electronics technology program.

High School Programs

There were eight high school responses in the mechanical technology program and eight returns in the electronics program. Analysis of the data indicated that there is a distinct difference between the vocational approach and the approach of the high schools who use the program as preparation for high level technical careers. In the programs which are vocationally oriented the program is geared to the lower ability student while the technical approach is geared to the average and above average student. The vocationally oriented programs indicate that the majority of their students do not go on to any post-high school education. The technically oriented high schools indicate that most of the graduates of their electronics program and mechanical technology program transfer to professional engineering schools. Some do go on to two year colleges, but the chairmen of the departments state that the two year colleges tend to duplicate the curriculum of the high school. The high school chairmen suggest the need for better articulation of programs and the possibility of advanced placement for high school graduates of the technology programs.

## BUSINESS TECHNOLOGY

Information was gathered in regard to two options within the business technology programs. These were secretarial and distributive education programs.

### Secretarial

The community colleges prepare students for executive secretarial positions. More specifically the objectives of the program are: (1) to develop skills necessary for satisfactory performance on the job, (2) to give students a fundamental knowledge of office procedures, systems, and machines, as well as a background in business theory and practice, and (3) to provide general education courses that will help the students' cultural development and encourage them to acquire the skills and attitudes necessary for responsible citizenship.

The high school program stresses the skills and job entry. The objectives are predominantly to prepare students to obtain beginning positions as stenographers, typists, or clerks. The program also provides an opportunity to integrate desirable attitudes, essential skills, and to learn such things as good grooming, business ethics, and personality development.

Of the 18 community college programs analyzed, only one indicated that there was a special requirement for admission to the program. Fifteen indicated no special tests were needed for entrance into the program. Most of the students were identified as being average in academic ability and fourteen of the department chairmen stated that they did not use the program to place students with low ability.

Chairmen of the secretarial departments of the community colleges indicated that the students in their program arrived with varied high school backgrounds—academic, commercial, or general. Predominantly, however, the students came from academic and commercial programs. The college curriculum stressed a mixture of skill subjects with general education. Students in the secretarial programs were required to take courses in English, Social Science, Science, Accounting, Business Law, and Business mathematics. The program also allowed room for electives.

In their response to suggestions for changes in secondary school philosophy and practice, the community college secretarial department chairmen stressed a need for better preparation in English with emphasis on spelling and punctuation. Suggestions also included better preparation in study habits and study skills. One recommendation indicated that "the system in New York State allows students to graduate from high school without mastering the basic fundamentals of English and Mathematics. We get some of these students and we must spend an extraordinary amount of time in remedial work." Other suggestions were: more academic discipline; a better understanding and knowledge of arithmetic skills; an insistence that high school graduates be able to read with understanding, write effectively, and express themselves orally.

In examining the data from 25 high schools, the biggest difference between the community college and the high school programs has to do with the nature of the student in the program. Sixteen high schools indicated that low ability students were placed in the program. Eleven high schools described their student body as average, eight as average to below average, and six indicated that the range varied from above average to below average.

Both institutions indicated that their program prepares students for exmployment as secretaries, typists and related positions in the business world. They indicated that the curriculum stresses skills plus general education and in addition attempts to encourage personality and character development. However, it appears that the college places greater emphasis on such subjects as psychology, laboratory science, and social sciences. The chairmen of the secretarial departments stated that the community college program aims to prepare executive private secretaries rather than general typists.

In responding to the question in regard to suggested changes that two year colleges might introduce, the high schools indicated that better communication and follow up information sent to the high schools would be extremely helpful. In addition these comments:

> The two year colleges should "grow up" and not try to outdo Harvard in entrance requirements. Why does a secretary need three years of a language and two years of mathematics? The two year colleges should understand its own philosophy with respect to two year vocational training in business areas, and graciously offer something to all pupils.
>
> It might be advisable for two year colleges to report to us a follow up of the success of our students. If two year colleges communicated their experiences, we would cooperate in preparing our students to meet their requirements.
>
> Who is to teach the basic liberal arts background--the junior college or the high school? If the junior college is to teach the liberal arts, then the high school need stress only the skill building and not the additional "frills."
>
> Reduce mathematics requirements for commercial graduates and accept applied arithmetic (or bookkeeping) as a substitute.
>
> Offer both Pitman and Gregg Shorthand so that pupils do not have to start a new system.

There is enough evidence from the returns that there is need for the establishment of closer liaison between the two year colleges and the high schools to explore possibilities of working together on curricula development. Many high schools indicated that the only assistance the community college provided was to offer the high school student a one day visit at the college in the spring. It is imperative that the high school knows exactly what the college wants and that the latter knows what the high school is doing. Several high schools indicated that the marginal student is finding college difficult. Perhaps increased and realistic coordination in curricula development between the high school and the college would help.

## Distributive Education

The community college programs which are usually called marketing or retail business management, prepare young men and women to become competent professional managerial personnel in retailing. A few of the community colleges indicated that between 30% to 40% of their graduates go on to earn their baccalaureate degrees in business administration. The curriculum is designed to provide a solid foundation in marketing courses, business courses, general studies, and work experience.

Of the 11 community college programs analyzed, eight indicated that there were no special admission requirements. One institution indicated that a minimum high school average of 70 and a minimum combined S.A.T. score of 800 was necessary for admission; another institution recommended that two and one half years of high school mathematics, a year of business law, and a year of biology be taken by the student prior to admission into the program; and a third indicated that a high school average which varied year to year was a prerequisite for admission. Eight institutions characterized their students as average in academic ability while two indicated that their student body ranged from average to below average. Ten of the institutions stated that they did not place low ability students in their retailing program.

Most of the high school students in this program have an academic or vocational background, however a large number of students in the program come from general high school programs. Most of the two year colleges indicated that the specific courses in Distributive Education at the high school level did not seem to give the student any advantage in the college marketing programs. The colleges indicated a preference for students who could express themselves well and do basic mathematics. The two year institutions all indicated that they found their present students deficient in English, Mathematics, and Speech. There was almost unanimous agreement that the high schools should not use distributive education as a dumping ground for students with low or limited abilities.

Twenty two of the 23 high school programs analyzed, indicated that the program is used to place low ability students. Twelve high schools characterized their students as below average, nine as ranging from average to below average, one as average, and one varying from above to below average. The high school program prepares students for entry as stock clerks, sales clerks, or sales positions in stores. None of the high schools mentioned mid-management or any managerial aims for their program. In addition many of the high schools indicated that the majority of their students in the program will not go on to any college. In response to the question of suggestions for change in the two year college philosophy and practice, the following are some typical responses:

> Be a little more realistic in their entrance requirements. It doesn't take an Einstein to do the work that many of these students will be doing. Had they the ability, they would have applied to a four year college. I suggest that two year colleges might have different goals rather than trying to duplicate the first two years of college.
>
> There is a definite need for further education in our subject area. In many instances, the lack of some college will bar them from executive positions and training programs. The current admissions policy of the two year college in our area has virtually barred our youngsters from full-time admission. We need a more elastic admissions policy for the schools in the New York State University System.
>
> The two year college should recognize the courses taught in distributive education when determining entrance requirements.
>
> There should be more one year retailing programs. This would not be a "degree" program but the student would receive a certificate. It should be a program that enables a student to go on from where he left off in retailing in high school so that he could easily move into junior management.

## IMPROVED ARTICULATION PRACTICES

Recent developments in electronics, space, and related fields have brought into sharper focus the almost critical shortage of trained technicians. We have been preoccupied with the training of professionals--engineers, physicists, mathematicians, scientists of all sorts. Now we see that in the performance of professional services teams of trained personnel are needed--a team that includes the scientist, the engineer, and the technician. By combining their skills the usefulness and productivity of each is enhanced and extended.

Many questions, however, are raised, as one begins to try to define the programs, identify the students to be served, and indicate the institutions to be involved in the technology programs. Technical education beyond the high school interwoven with general education is and ought to be a major concern of the community college. The question remains, however, at what level should these programs be developed; a related question, what is the role of the high school in technical education?

In trying to get some information as to the nature of the programs being offered by community colleges and high schools in New York State in selected technology areas, questionnaires were sent out (see Appendix A) and the returns analyzed. The analysis indicated that there was a great deal of misunderstanding by both institutions as to the work each was doing and also that no effort was being made to attempt to develop coordinated programs in mechanical, electronics, and business technology programs between high schools and community colleges.

## Present Practices

The chief administrative officers of two year colleges were asked to respond to the question, "What are some ways in which your college and the high schools are at present carrying out articulation activities in business and engineering related technologies?" Of the 25 institutions responding, the principal activities carried out were high school visitations by community college admissions officers and faculty members and mailing of printed material such as brochures and catalogues to the high schools. Other practices that were identified are:

1. In some institutions faculties in the various disciplines meet occasionally with their counterparts in the high

schools. None of this was on any formal or organized basis.

2. A monthly newsletter was sent by the college admissions office to high school counselors.

3. A few colleges report back to the high schools on the progress of their students at the college.

4. One college indicated that senior students in the high schools, with the approval of their principals, have been allowed to take a freshman course at the college in the field in which they hoped to specialize. These students have usually been brighter than average. The same college conducted a two day program for economically deprived students in the hope that interest would be stimulated in the possibility of obtaining a college education.

5. Some of the City University of New York's two year colleges are involved in a pilot Pre-Tech program. Students from local high schools are admitted to the two year colleges and pursue an enriched curriculum in their assigned specialties, the curriculum having been devised by a study team consisting of a member of the college faculty and a member of the high school faculty.

6. The City University of New York's two year colleges are involved with "Operation Bridgeheads" whose function it is to help high school students find out more about the community colleges.

## Improved Techniques

Despite the fact that much appears to be going on, many of the presidents and deans of two year colleges feel that not enough articulation both in terms of quantity and quality is taking place at the present time.

In response to the question asking for suggestions for improved techniques in articulation, many of the respondees indicated that they have become aware of the need for more satisfactory procedures and have appointed study committees to work on this problem. More specific recommendations included the following:

1. Inclusion of high school teachers on advisory committees.

2. Increased visitation between the faculty of the college and of the high school.

3. Granting of credit by the district superintendent towards continuing certification or advancement for courses taken in technical education at the community college by high school teachers.

4. Summer workshops in which two year college faculty and high school teachers could work together.

5. Establishment of joint curriculum committees in each technical field.

High School Responses

Of the 27 high school returns, the majority of the principals did not feel that very much was being done in the area of articulation. The one activity that seemed to predominate was College Career nights with the community colleges sending representatives to the high school programs. In addition, the community colleges did share catalogue and program materials. Seven of the high school principals indicated that there was no articulation between high schools and community colleges in the business and engineering related technology programs.

The high school principals had several recommendations for improving articulation practices. Over half of the respondees suggested that there be more frequent visits between faculty members of the high schools and the community colleges. The principals suggested that there be joint curriculum committees established as well as joint study groups to work on problems of mutual concern. One principal suggested that teachers be exchanged for semesters in the technology areas. Another suggestion that several principals expressed was that the community colleges send records of progress to the high schools. Advanced placement and increased permission for high school students to attend freshman courses at the community colleges was also recommended by the principals.

## CONCLUSIONS

The research produced evidence that there is little being done to articulate the educational efforts of high schools and community colleges in the areas of business and engineering related technologies. There is a good deal of misunderstanding among many high schools in regard to the work of the two year colleges and among community colleges in regard to what high schools are attempting to do in vocational-technical education. In many instances there is wasteful duplication of effort as well as poor counseling on both levels as a result of lack of proper informartion

One certainly can conclude that much research and continued planning has to be undertaken by both high school and community college educators working together in an attempt to answer some of the following questions:

1. How much duplication of effort is permissible?
2. How much liaison should there be between the community college and the feeder high schools in regard to course planning?

3. What should high schools and community colleges do to orient students before they enter the college?

4. Should there be planned coordinated curricula for grades 9-14? If so, what should they be?

5. What immediate activities can be undertaken to improve articulation between high schools and community colleges in the areas of technical education?

# THE CONFERENCE

# CONFERENCE ORIENTATION

## STATE COMMENTS

Alan G. Robertson
Chief, Bureau of Occupational Education Research
New York State Education Department

The problem of articulation of content, program, and instruction between high schools and two year colleges has been given a high priority by the state. The problem concerns "who" is going to do "what" in terms of content and instruction with "which" in terms of equipment, course titles, preparation for types of jobs, and with "whom." The conference has brought together from the entire state, experts in content and instruction in the areas of business and technical education at the high school level and the two year college level. We are not planning to get instant results from the project. The project is just a beginning. In bringing the various participants together, we hope that the discussions will start a dialogue which will eventually lead to better articulation practices between the various institutions of New York State.

As the State Education Department looks at what the possible outcomes of the conference will be, they are not expecting answers to come out of this particular conference. You cannot get answers in two and one-half days; it is a longer process than that and we realize this. But we are hoping that the conference will pick out some signposts—some next steps to be taken. We are hoping that we will get suggestions which will clarify the roles of the State Education Department, local agencies, universities, two year colleges, and high schools. We hope that we will get indications of where we go from now on, looking ahead ten years from now. We hope to get some indication as to whether it would be feasible to start planning technical programs leading to a sequential approach from grades ten to fourteen.

In addition, we would like to get the reactions of the participants to the white paper on occupational education, policies, and implications that was issued in the summer of 1966 by the Board of Regents. Part of the paper suggests guideliness to be used in determining whether a given occupational education program should be offered at the high school or two year college level.

In conclusion, I think one of the most important outcomes of any conference like this is the interaction of the people involved on a face to face basis, talking shop, if you please, during lunch and getting to know each other and work with each other. Very often, more is accomplished behind the scenes, than in the formal meetings.

## CUE COMMENTS

Mortimer Kreuter
Assistant Director, Center For Urban Education
Associate Professor, Special Education
Teachers College, Columbia University

Good morning, colleagues. I am delighted to greet you on behalf of the Center for Urban Education. Let me quickly plunge into the business at hand and describe the work and place of the Center especially as it concerns the kind of work that I think that all of us in the educational enterprise will be engaged in increasingly over the next decade and probably until the end of this century.

It is no news to you that there is an increase and almost awesome interest in federalization of the public school program in the United States, and that the supports for a deeply developing linkage of state and local schools to the federal notion of education will be part of our agenda for a good number of years to come. With that in mind, the Elementary and Secondary Education Act of 1965 was passed and has been extended again this year.

Let me then tell you something about the Center for Urban Education and how we became involved in this particular piece of work and how increasingly we hope to become involved with you who are practitioners and researchers and administrators in the vocational and technical education field. The Center is a social, scientific, and educational organization devoted to studying and improving quality education in the large urban centers of the United States. Its most particular focus is on the programs in New York State. It was originally begun by several major universities in New York City area including Teachers College, Columbia University, New York University, The City University of New York, Yeshiva University, the New York Medical College, and Bank Street College of Education. The Presidents of these institutions, recognizing that there would be a federal input into public education attempted to set up study centers and demonstration centers on urban education. After receiving a cold rebuff from the federal establishment, it became clear that what they ought to do was to have a cooperative arrangement among themselves. They thereupon created what they called a consortium of Universities and established the Center for Urban Education.

As time went by, the Center became a regional education research laboratory. There are now twenty of these in the United

States funded by the Office of Education under Title IV of the ESEA. And their mission if you will bear with me for a moment, is stated in a letter from the President to Secretary Gardner dated July 5:

> I look to these educational research laboratories in the regions to: (1) stress putting into practice what we already know--the increase of knowledge through research must proceed at a rapid pace, but we have an even greater obligation to overcome the lag between discovery and use and to convert the results of years of research into application in classrooms. (2) To deal with the highest priority common problems of education with which every community struggles and in so doing to contribute to a general elevation of the quality of education everywhere. (3) To involve outstanding scholars, experts, and artists in the development of new educational programs so as to assure that better methods of instruction are accompanied by improved content. and (4) To be a part of community life drawing out public support and involvement in innovation in education and calling up the resources of the community and industry for planning and operation.

The President of the United States, then looks to these educational regional research laboratories to do work which will involve us deeply, pivotally, and significantly in the changing educational practice in our classrooms. Now with this as our standard, the Center for Urban Education developed a prospectus for involving practitioners and theoreticians in social science and education to accomplish this mission. And in the year and one half that we have been in operation, we have managed to recruit what we think is exceptionally good senior talent to do research. Hence we reached out to Michael Brick who has expertese in both the practical and theoretical areas of education particularly in the community college and higher education fields; and he accepted a research appointment at our institution. We have done this in a number of other cases.

But why vocational and technical education? And how does it fit within the general mission of the conference? I think that it is no secret to you who have spent your lives in this field to know that the community college has always been an experimental, innovative, and highly competent force in attracting the level of learner who needed a special kind of learning. Community colleges historically, have been a place where breakthroughs have been achieved for the learner who needed a different kind of learning than the straight didactic typical academic approach with which he was presented in the traditional colleges. We reach out to the community college people, who have this vision, who have this ability to break new ground, to utilize this current research and work with it in classroom practice, which is what we were enjoined to do under the rules that established our organization. Likewise, and in a much more penetrating way from the point of view of racial integration in the schools, vocational and technical high schools in our country have made possible a secondary education for those who might not fit the normal parameters of entrance into a kind of education which has been traditionally offered under the Carnegie Unit Plan or the plan of program which leads to an academic program in later life. You have vast experience in opening your doors to students who are not limited in learning ability but somewhat different in their motivations, somewhat different in the kinds of things they want to learn. So that the Center looks to vocational and technical educators, the community colleges and the vocational and technical high schools to help us offer to the general academic high school and to the general college the kind of learning that we will have to give in the next twenty-five years to a different kind of clientele who never entered or who had difficulty entering into post-secondary education. You have this experience and you have this kind of insight.

Just another word so that you may have a more complete picture of the Center and its operation. While located in the middle of the City of New York, it extends its horizon to a tri-state region from Newark, New Jersey all the way to Bridgeport, Connecticut. An example of the work in which the Center has been engaged that has direct interest to your particular mission here this morning, is a study of the vocational and technical high schools in Buffalo. There we found, not to your surprise but to ours, that the vocational and technical establishment in Buffalo is of exemplary quality and has very selective admissions requirements. That is the kind of program that we would like to study further so that we can use it as a model. We are currently engaged in the City of Rochester, where we will do some studies in vocational and technical programs, extending it somewhat downward to their world of work in the elementary schools. We are also engaged in the cities of Glenco, Long Island; Stanford, Connecticut; and Bridgeport, Connecticut, so that the Center for Urban Education is truly regional and works not only in New York State and New York City, but is available to the surrounding regions. We have on our staff 125 full-time educational and social science personnel drawn from all phases of both the university and the public school field. We are increasingly drawing on business and technical personnel to work with us in examining and extending the range of knowledge and current research from the fields represented here this morning.

The main purpose for joining forces with the State Education Department to sponsor this workshop, from the Center for Urban Education's point of view, is to meet the charge of the federal government and to plunge what is known into the unknown and to help set up in classroom practice the kinds of things that are necessary for the youngsters of New York State in this particular instance, and I am sure with broader applicability. I hope that you will have a thoroughly exciting time at this conference. I look forward to your results.

## CONFERENCE PURPOSES AND PROCEDURES

Michael Brick
Associate Professor of Higher Education
Associate Director, Center for Community Colleges
Teachers College, Columbia University

I think it might be well at this point to talk about how I view the purposes of this conference. Although the conference is focused primarily on articulation, I do not believe that you can avoid the broader issues and broader discussions as you focus on articulation between high schools and community colleges in technical education.

The first and major purpose of the conference is to take a step in the direction of confronting and beginning to resolve some of the articulation problems faced today by community colleges and high schools in the field of technical education. I stress the words beginning to resolve because this is basically a preliminary conference, a beginning of people from two year colleges and high schools to sit down and explore the issues and the resolution of these issues. The conference, I hope, will explore elements of curriculum content in secondary school business education programs, and programs in the mechanical and electrical areas. This content analysis will be compared with the counterpart curricula in selected two year colleges with the hope that the conference can develop and determine areas of possible curriculum interrelationships. It is hoped that out of the conference will come recommendations for further analysis of subject matter content and instructional practices, and recommendations indicating possible methods of initiating continuous curricula from secondary through the post-secondary programs in selected content areas.

How are we going to do this? Well, first through the presentations made by consultants; second, through the evaluation of these presentations; and finally, through the development of new proposals for action and research that may be carried out with aid from outside financial sources through universities, high schools, two year colleges, and other agencies represented at the conference. It is not the intention of the conference to achieve a paper setting forth a mandate to educational institutions in New York State as to how they shall organize and develop their programs. I hope that the atmosphere of this three day conference will be one of complete freedom and candor.

In addition to this general purpose of the conference in regard to articulation issues, the discussants will consider some broader questions. The first set of questions has to do with the general purpose of occupational education. As a matter of fact, the afternoon session will address itself to the broad questions and issues in vocational-technical education. Many answers ensue when you ask for "purpose." One point of view contends that occupational education is essentially exploratory, designed primarily to permit a person to learn the nature of a particular kind of work and his aptitude and interest in it. At the other extreme is the position that the function of occupational education is to equip the individual to perform effectively in some specialized occupation. Between these two views are several other positions. Some maintain that occupational education prepares a person to enter a general occupational field. The employee will then learn the necessary specific skills for his particular job. Others believe that occupational education should be a supplement to on the job training. These contentions revolve around a central question--which occupational skills should be developed in school and which should be employment based? I am sure there must be other sets of questions or related questions that I have not even begun to touch upon.

Educators often affirm that occupational education should be education, not training. Training should refer to the learning of skills, with meaning only for employment; occupational education should have a broader function. This brings us to the relationship that should exist between general and occupational education, and, within occupational education, between the learning of specific skills and the general preparation for subsequent employment.

Another question emerges from this--how long should an occupational training program be? Because of the necessary admixture of general education to the program as well as time lost through school holidays and vacations, there is serious doubt whether a school should attempt an occupational program of less than one year. At the other extreme, once young people tire of general education, and develop a specific occupation orientation, it may be difficult to keep them in school for more than two or three years. Once the idea of occupation and employment crystallizes, anything less than an actual job begins to pall on those young people.

The next set of questions has to do with who should enter these programs and how their entry should be determined. What should be the nature of guidance and selection processes? Some programs have tended to select only the highly qualified. Some programs have tended to operate without any kind of selective process at all. One can raise a question as to whether the highly qualified student should be urged to go on to the next higher level. For instance, a youngster who is highly qualified for a high school drafting program might better be encouraged to delay his occupational preparation until junior college where he might enter an engineering technician program. Similarly, a highly qualified youngster who is much better than the average in the engineering technician program might be encouraged to enter a four or five year engineering program instead.

Other problems arise if the entrance requirements for a particular program are low. After graduation, many youngsters may do poorly on the job. This raises the charge that educational resources are being wasted. Indeed, a significant number of poorly qualified youngsters in any program may create a bad reputation for the program and thus harm the employment prospects of those who do well. However, if admission standards are low, many youngsters are offered an opportunity for significant improvement in their occupational status which otherwise might be denied them.

There are many other questions. At what point do you leave the general education stream for a specific occupational education? How shall occupational programs be housed and located in relation to other educational programs? To what extent should students be confined within a program or alternatively educated along with students in other programs? What should be public policy with respect to providing separate vocational secondary schools as opposed to the so-called comprehensive high schools? Some of the things I've just enumerated represent a rather large order if we attempt to solve them all. However, all we intend to do here is set the stage and begin discussions, and hope that out of this we can develop some better articulation procedures.

How did we organize the conference and what was our thinking as we set up the program? For one thing, it is an invitational conference. We extended invitations to persons representing the university, the high schools, and the two year colleges. In addition, we invited representatives from the State Department of Education, the State University of New York, the Center for Urban Education, and the American Technical Education Society.

The organizational framework of this conference provided for the identification of issues relating to three broad areas involving purposes of vocational-technical education, curriculum, and the student. Recognized authorities were asked to deal with each major area. Following each of the major presentations, conference participants will form discussion and reaction groups to consider, discuss, and evaluate the materials, suggestions, and ideas given to them by the speakers.

Let me wish you every success in your deliberations.

# ARTICULATION ISSUES IN VOCATIONAL-TECHNICAL EDUCATION

Sebastian V. Martorana
Executive Dean for Two Year Colleges
State University of New York

I want to stress how much we in State University, who have the responsibility for coordinating, supervising, and promoting the development of strong community colleges throughout the state, are happy that this conference is being held. Too often are educators concerned with articulation between the two year college and the four year baccalaureate colleges—articulation upward, so to speak. Too little, however, is there an outlook from the community colleges to the high schools upon whose programs the community colleges and the agricultural and technical institutes should in fact build.

I would like to point out that I am going to try in my presentation to raise certain issues, not by numbering them or identifying them specifically, but by referring to the development of community college level occupational programs, with particular reference to New York State; and somewhat as I see it, refer to the same development of occupational education on the high school level; and in this discourse touch upon that area that represents our issues or problems in the articulation process. And I might say here that my objective is not to accentuate the problem, but to stress the need for more cooperative venture between the people at the high school level and the people at the community college level in the interests of developing improved sequentiality of programs and better articulation.

Looking first at the occupational programs in the state at the high school level, I think there are certain observations that can be made that bring out issues that demand our attention. In the first place, I think it is a clear observation that historically speaking, vocational or occupational programs in the high schools have too often been, for lack of a more descriptive phrase, dumping grounds for the lower ability students. And, therefore, we have the problem of developing an attitude or a public image of vocational-technical education that is quite different from the negative one which exists and which views the occupational programs in the high schools as the place for the less able students to find themselves and remain during the time of compulsory educational attendance. Also at the high school level, I think it is fair to say that the vocational-technical curriculum structure seldom is organized in a way that prepares students for going on to existing post secondary school programs. In other words there hasn't been much attention given to a deliberate articulation between high school and post high school programs. This is true nation wide. There is therefore, the problem of developing an improved method of curriculum planning and curriculum development at the high school level with that which would occur at the post high school and community college level. In addition, I would like to point out that high school size and student population on a unit basis, especially up state, has prohibited the development of adequate vocational technical programs or the development of what we call the comprehensive program. So you have an issue that relates to size and economy of operation.

If we look at the post high school programs in New York State, I think we may also see some issues which are of a related nature. Nearly all opportunity for post high school education in New York State, as most of you know I'm sure, is related to technical and semi-professional programs of high level. Historically there is a preoccupation on level, with the stress being on programs that could be termed "collegiate grade" rather than on "programs" whether of collegiate or high school level that may properly be offered to a constituency, population, or age group that has come on beyond the high school.

The same thing could be said in reverse that I said about the high schools not articulating in its curriculum planning with the community colleges. The same thing could be said about the community colleges—in planning its curriculums it has not looked at the experiences that students might have received at the high school level. So the problem of lack of cooperation in curriculum development is just as validly aimed, if you are going to place blame, at the community college leadership as at the high school leadership.

Some current developments in New York State I think also bring out issues that might be of concern to us. You should be aware by now that a change in the historical position of two year colleges has been advocated and set in motion. The change is one from concentration on high level technical and semiprofessional programs and liberal arts education to a concentration on a truly comprehensive program at the post high school level ranging all the way from liberal arts transfer curriculums through and including technical and semiprofessional programs and including vocational training at an artisan or crafts level—in other words the full range of services for a clientele of post high school age. In order to implement this at Alfred Agricultural and Technical College they have a number of short, non-credit programs going into operation; one year certificate non credit programs are in operation or are planned for at Farmingdale, Morrisville, Corning, Hudson Valley, Monroe, Suffolk, and half a dozen other community colleges in the regular day program--not as evening extension, but available in the daytime for students who want to come and are available for full time day study.

Now this raises some real issues as to communication and horizontal articulation shall we say, between all of the agencies involved in educational development in New York State. I am referring of course to us in the State University, to the community colleges, to, in the case of New York City, City University, to the community colleges in New York City which are part of the state-wide program, to the state oducation department, and to the boards of cooperative educational services. All of these agencies, and others that could be named, have a problem; or there is an issue of proper involvement in communicating about their roles and resolving their roles in state-wide planning and thereby clarifying the roles of the high schools on the one hand and the community colleges on the other. Some real progress has been made, in my judgment, in this area in the last year or so. The state-wide and regional conferences that brought together the responsible people, have been very strong strides forward. At the same time we recognize that achievement, I think it is fair to say, that a lot more needs to be done before we have really a clear understanding on the part of all concerned as to what is the state design--the grand design--in occupational education.

In my judgment the role of guidance and counseling at both the high school level, and at the community college level, is not sharply understood or respected. We at the community colleges state as a strongly reiterated commitment that there should be guidance and counseling commensurate and coordinated with a widespread choice of curriculums and that these should mesh in the interests of good strong educational services for a heterogeneous student body. That is what we say, but when you look at what we do there isn't a very good record to match performance with verbal commitment. And I think the same thing is true in many instances at the high school level. So here is a problem or an issue that we need to give attention in order to make our guidance work really more effective. In the realm of our faculty, I think a couple of deficiencies show up that merit our concerted and cooperative attention. I believe it is accurate to say that our instructors in the occupational fields at the community college level, have not had a very strong orientation in the business of being a faculty member or a teacher of young people or of adults. Moreover they have not been trained to become sensitive to or understanding of the problems of articulation between the high school and the community college. They have not been urged or led or helped to find ways to establish communication with the high school counterparts to establish a dialogue, a dialogue which I believe would be very helpful in doing a better curriculum development job at the community college level.

Now, let's look for a moment at the problem of articulation from the community college level upward to the university level. There ought to be articulation from the community college level to the university baccalaureate and master degree level in certain technical fields to allow people who have come through the community college as technician trainees to go on to get this kind of advanced training. I am not advocating that our emphases on occupational training curriculums which we now stress, be in any way watered down or changed and these programs made transfer programs to another kind of baccalaureate or master degree level. I am merely saying that in New York State, at any rate, in State University units and state-wide, we do not have many programs that might be called advanced occupational programs leading to the bachelor or master degree in certain technologies—business administration, nursing, engineering related, and the like. There are very programs of this kind; and in the University's master plan we do show some intention of correcting that.

I want to close my presentation by reading to you from the report on Automation and Technology in the American Economy. It raises issues that I am sure will provoke discussion and I hope follow-up action on the part of all of us who are here today. These are the concluding paragraphs from the report and these are the recommendations:

1. High quality compensatory education should be available to every child whose life opportunities would be improved by it.

2. The quantity and quality of primary and secondary education especially in low income urban areas as well as rural backwaters should be improved.

3. High school graduation should become universal.

4. For most secondary school pupils, vocational training should be deferred until after high school.

5. A nationwide system of free public education through two years beyond the high school should be established. The key

institutions would be area technical schools and community colleges.

6. All qualified students should have a realistic access to university education with a nationwide system of community colleges. Standards for entrance to the university should be established at a level appropriate to the work of university grade.

7. No qualified student should be deprived of education at any level because of his family's lack of financial resources.

8. Education, training, and retraining should be available to individuals throughout their lives.

9. A special need is to provide more extensive educational opportunities for adults whose basic education is deficient.

10. The Manpower Development and Training Act has made a start in the retraining of employees and the unemployed but the program must still be described as experimental. We recommend that it be expanded.

11. The laws of some states prevent unemployed workers from receiving training while drawing unemployment insurance. There should be some way of subsidising people while retraining is going on!

12. Training and retraining for most jobs occur at the work place as a responsibility of the employer. . . . Effective as on the job training is for the teaching of specific skills, it is limited in its ability to review and improve basic education. In my judgement, this has real implications for both high school and community college occupational education.

13. It has been far too common in the tradition of mass free education to ascribe inadequacies to the individual student rather than to adapt educational techniques to meet the needs or

to overcome the limitations of individuals. How true that is, at the community college level, as elsewhere. We try to fit the child to what we want the mold to be and not the mold to what will be helpful to the youngster or the adult for that matter.

14. In retrospect, one of the highest return investments we as a nation made was the G. I. Bill following the second world war and the Korean War.

We are all educators endeavoring to develop the best educational system we can in a state and hopefully in the nation and in the world. In my judgment, if we strongly commit ourselves to this kind of a guiding philosophy we would not only cooperate but our cooperation would be directed toward objectives that would really give some strong assurance that our concentration would be of service to people and to the development of an efficient coordinated articulated educational system, and less and less on competitive development between various institutions.

# CURRICULUM AND INSTRUCTION IN VOCATIONAL AND TECHNICAL EDUCATION

Gordon Van Hooft
Chief, Bureau of Secondary Curriculum Development,
New York State Education Department

In order to articulate programs it is necessary to understand what is going on both at the secondary level and the two-year college level. I also think it is obvious that by having contacts we can develop mutual respect for each others program problems and see what can be done to resolve some of the articulation problems that do exist. Through this understanding we may better accept the common goals that we both have in the matter of educating all of the youth for a better and more productive life; and we can also distinguish the unique roles that are implicit in the services that are being offered at the different levels. Occupational education is an integral part of education at every level and should be drawn more into the main stream of education.

First of all I want to give you what I see as the big picture occurring at the secondary level and try to interpret some of the changes that are going on and particularly why these curriculum changes are going on. I am going to indicate very rapidly some of the common denominators and some of the major educational or general education projects that are under way. Everyone who looks at the articulation problems between secondary schools and the two-year colleges recognizes that if youngsters are required to have ten to twelve units of general education, there is an articulation problem between the general education program at the secondary level and the two-year college level, as well as between the vocational programs.

In curriculum we have been paying attention in recent years to sequential planning. Now in general education, this takes the form of K-12 sequential programs that have the distinct advantage of having some linearity. I think all of you have gone through enough programs in education that I don't have to be specific in terms of naming the curriculum areas so that you will know that there has been too much repetition in content and that there has not been a properly developed sequence of skills. This is one of the big characteristics of the last ten years. We have certainly been in the process of adding and updating content. This is being done in all areas to meet the problems posed by the explosion of knowledge. But, in turn, it has posed the problem of how can we do this better than the traditional method of adding this type of content on to the end of textbooks and having the teachers go through the first five hundred pages and miss all of the new material from page five hundred to seven hundred. I think we are seeing more and more of this new material added as integral parts of the courses of study. This means that we have had to pay attention to a process of selectivity and I think in order to do this we have had to pay some attention to the work that is going on among the different scholars and the different fields in terms of general education programs. I suspect that this is paralleled by some other things in some of the vocational technical areas as well.

The key word here that I commonly use is structure, because I think more and more we are attempting to try to identify a conceptual framework upon which the youngsters can hang many facts and ideas so that there is a little more meaning and understanding. The new courses of study that are being developed very frequently reflect this in terms of attention that is paid not to outlines of content, but to identify understandings, generalizations, concepts, and to focus upon the methodology on which the concepts are developed. I think, in terms of the methodology, all of you who have been following the projects in science, in particular, and in mathematics and the social sciences, recognize that more and more attention is being paid to what are called the process goals. This means that much of a K-12 program in science, particularly at the early level, focuses more upon the experiences that lead to understanding than they do upon reading programs. The process goals in science may receive less attention at a latter stage but they are in the picture at all stages and relate to what is called in some circles an investigative approach to learning.

When you talk about structure and its conceptual framework, you immediately turn over the coin and find related on the other side the fact that each discipline, because of the nature of subject matter and perhaps for other reasons, has a unique method of inquiry. This in combination with more selectivity means that the basic thrust is not to cover a lot of material of which there is too much to try to cover anyway, but to focus much more sharply on less content, fewer major areas; and to uncover or perhaps let the students uncover more in process.

Finally, there is more use of the discovery approach being recommended. This essentially consists of allowing the students to dig up some information for themselves, collect the data, organize the data, and draw some inferences from the data and to enable them to gain some understandings based upon this, rather than to have the pupils and the teacher regurgitate the textbook, frequently with errors.

I think these are the common denominators which have certainly a lot of implications in the academic areas and, I think, also in the vocational areas as well. It relates to the fact that we are not as interested as perhaps we have been in the past in teaching what, where, and when; but we are more interested in the questions how and why? And when you are talking about skill development I think this enters the picture to a large extent because you are not only interested in having a person know what he is doing, but to understand what he is doing, and this has implications for how you go about doing the job.

The major development in terms of the English program is essentially a major attempt to identify a sequential program of skill development. In the social studies area, the major thrust is in terms of selectivity of content, emphasis and understandings and generalizations leading to concepts, with a great deal of removal of repetition.

It is not only important that the person heading for an occupational career knows what he is doing and understands what he is doing, but also he needs to understand the people with whom he is working. This makes the study of human relations important and it has a bearing on the need for a sound background in the social studies. I think here again, the general education program needs to be improved by having some adaptation for pupils who are in the required programs who are not able to approach quite so sophisticatedly some of the material as would be implied in the conceptual approach.

In mathematics the problem is to get some sensible adjustment so that we have the basic mathematics necessary for not only the youngsters going out into more mathematics, but those going on to the careers that will make use of the mathematics that they are currently taking.

In science we have had the greatest impact from the national level. The programs being developed in physics and chemistry and biology at the senior high school level reflect to a great extent what has happened in the national projects. However, I think I would be the first to admit that we are widening the gap for many youngsters by the nature of the courses that have been developed in physics and chemistry and biology. The courses are highly abstract and highly quantitative in nature and, while this is all to the good for the youngsters who can handle this type of material, it poses quite a challenge to many others.

I don't think the specialist in science has really been concerned with the general problem of the needs of the boys going into the technical occupations. I think they have been thinking essentially in terms of how can you accommodate all of these kids in one physics course. Now that this has become a very difficult problem, they are beginning to explore in physics and chemistry what other types of courses are needed to satisfy the needs of the kids who are not going into the four-year programs or not going into science and engineering. And believe me, this is not easy, because here again as soon as you set up a large number of parallel courses, it becomes difficult at the secondary level to provide proper guidance and it poses a number of other problems at a later point. But frankly, we are going to have to do it; we are going to need the help from the two-year college people in identifying what this means in terms of the pre-science background or the pre-math background of those who are going into the technical program.

In order to clarify my own thinking about general and vocational education, I would like to speak about four uses of schooling. These are the associative, the replicative, the interpretive, and the applicative. The associative use, very briefly, is why we justify many things in the curriculum that seem to have no particular use at the moment. But I think all of us in our individual experiences have learned many things that are used in context at some later time. Many of these learnings are associative in the sense that they are recalled, made use of at different times.

The replicative uses are the ones involved in simple copy work. We teach the handwriting skills, for instance, for replicative purposes.

More recently, I think the major thrust is related to the interpretive approach, where we are trying to develop what might be referred to as cognitive abilities. I think these three--the associative, the replicative, and the interpretive--are generally thought of when we think of the making of a good life the objective of general education. When we think of the applicative, we are more inclined to think immediately of vocational education, where the different learnings that are going on are applied. Certainly this is true and must necessarily be true in terms of vocational education because we do expect that the students are going to be able to apply the learnings at a later time on the job.

Now to the extent that these are kept mutually exclusive, I think we are in trouble. We have not capitalized on the fact that in order to make the teaching of mathematics more meaningful, we must have some greater emphasis on the applications that will be made of it. I think the whole question at the present time is whether or not the educational program is relevant to young people. I think we have to convince them that there are many useful applications of the knowledge that they are getting; to the extent that we neglect this, we are not providing a solid basis for the learning process.

On the other hand, in vocational education, to the extent that we neglect the focus on understanding the implicit and interpretive use, I think we are going to have more and more people unhappy on the job, lacking the understanding not only of what they are doing, but of their role in the total society, their role as a productive citizen. So I am merely indicating here that I still feel that we can improve both our general education and our vocational education programs by blurring out sharp distinctions and by recognizing that if we are going to have a stronger program, we are going to have to start bringing together the elements of each into a more meaningful package.

We are trying to develop programs for the low intelligence ability group ranging to the gifted--the total spectrum. This poses quite a problem when you try to translate our aim into developing appropriate vocational curriculums to meet the needs of such a wide spectrum of abilities and interests. Essentially what we are doing is to develop programs focused on large clusters of related occupations. I think we make a mistake if we equate the problem of the disadvantaged with the very low skilled or exploratory program. We have to develop programs that will be adequate to meet their needs, but I think many of them will fit into different parts of the pattern from the low skilled to the high skilled jobs. The type of programs that are needed for many of these youngsters have to be highly flexible; they perhaps need to take on some characteristics of ungraded programs; and they have to make provision for switches as changes in interests are identified. We have an enormous problem here of developing a range of curriculums to accommodate the needs of youngsters of different capacities as well as to meet the needs of our changing technology. And I think there is no better way of bringing my presentation to an end than to identify very rapidly how this translates into what is going on in the vocational curriculum areas.

In agriculture, there are new occupational courses arising particularly in such combined areas as agriculture and business, and getting into areas that are not commonly thought of when we think of agricultural education. There is not only a revision of the basic programs in Ag. I and Ag. II, but there are new developing programs including the agricultural business and the agricultural mechanization and conservation, the ornamental horticulture, and the like. Some of these present articulation problems where you have comparable programs in two-year colleges can only be resolved by a decision at the area level as to where such programs will fit. If you have parallel programs, there needs to be local planning of programs so that you will take cognizance of the articulation problems to the greatest extent possible.

In the area of business and distributive education, I think the main thrust has been in terms of new materials that have been developed for the introduction to automatic business data processing, and training key punch operators. These new materials are being integrated as fast as possible in existing programs so that there are materials available for teachers in different areas of the business program. But there are the perennial problems of revising and up-dating courses of study.

In the area of trade and technical education, the projects which some of you have been involved in this summer range from cosmetology to instrumentation.

I have presented the curriculum data because, as I said at the beginning of my paper, articulation is more than anything else, an understanding of what the other fellow is doing. I trust I have helped with this understanding.

# THE STUDENT

James Moore
Chief of the Bureau of Guidance
New York State Education Department

There is an enormous advantage to being last on a program. I expect to find the advantage to accrue to me in that perhaps you will not follow my every nuance as you might have if we had talked a bit earlier. I looked upon my assignment as one to provide you with some information concerning the statistics of pupils in secondary programs of business, electrical, and mechanical occupational education both on the vocational and technical level. I was seeking the educational characteristics of the students in these programs.

Now ideally what we really ought to be able to achieve is an academic inventory such as is advocated by Conant and others which contrasts the ability and performance of pupils in particular educational programs. There is an enormous dearth of data in this respect, particularly as regards vocational and technical pupils. I have looked, I have talked, I have called, and I cannot find very much up to date information concerning the performance of pupils in vocational-technical programs versus those in other programs. I have assembled everything that seemed to bear on the topic and will share it with you. The information is fragmentary and there is not enough to reach any significant conclusions.

What kind of kids are in vocational programs? One percent fall in the upper five percent of ability, 10 percent in the upper 15 percent of ability, 19 percent in the upper 25 percent, 60 percent in the great middle group, and 22 percent in the lower.

* * * *

I. Q. may not be a particularly good indicator of vocational success.

* * * *

It is easy to prove or demonstrate through testing that those students who continue their education have more ability than those who do not.

* * * *

In comparing the relative ability of students in business with students in general, there is some evidence to suggest that the business students have less measured ability than those in other areas.

* * * *

The middle pupil in the vocational high school falls somewhat below the population for the whole system. The median pupil in the technical high school is better than 76 percent of the pupils in the school system. As you can see, there is quite a considerable difference of performance of pupils in technical high schools and those in the vocational schools. The middle pupil in the technical high school is a fairly good student.

* * * *

As I examined the statistical data available this is what I thought I saw. I thought I saw that vocational pupils seem to fall in the average range of student ability. There also seems to be reasonably strong evidence that technical students range from average to superior in ability. One thing I am most certain of is that we need data on the characteristics of students in occupational programs for New York State. We need better follow up of the graduates of vocational programs and I hope that this kind of project can get started in New York State.

The guidance counselor has a very important role to play in vocational education. It is important for the guidance counselor to keep options before the pupils in vocational education and to provide information in cooperation with other staff members to the end that students are not frozen into a particular vocational program but have an option to constantly evaluate the appropriateness for them of a specific program. The vocational pupil ought to be able to move closer to the program that best fits their abilities. As students approach the point of career decision making, counselors and staff members once again should carefully evaluate with the student the possibilities of higher education for them. Paramount to all of this is an improvement in the availability, quality and use of occupational information in occupational education, or in fact, in all education. Perhaps, one of the most important things that we in guidance can do is help students view occupational education as a realizable opportunity. We have to free occupational education from some of the misconceptions that cloud the views of students, their families and the staff and prevent occupational education from being seen as a real opportunity.

# CASE STUDY

## THE CITY UNIVERSITY OF NEW YORK AND ITS ATTEMPTS AT ARTICULATION

Elbert K. Fretwell
Executive Dean for Academic Development
City University of New York

Starting with a Bird's eye view of City University, as many of you know, it started out as the Free Academy, becoming the City College around 1847. It has now blossomed out into a dozen institutions consisting of five senior colleges operating at the present time--City, Hunter, Brooklyn, Queens, and the College of Police Science, and another one ready to open soon on Staten Island; a graduate division; and six community colleges.

Let me say that I am happy to identify with the community college part of the City University spectrum. The new Community College Handbook of the City University lists program offerings for next fall, 1967, under two kinds of headings: first is transfer, and the list of those is fairly simple; and then somewhere in the neighborhood of a couple dozen career programs. Articulation involving the community colleges and their programs can take place, as I see it, in five different ways.

First and foremost because it involves the greatest number of students is articulation with the secondary schools. Second, there is the articulation with pre-collegiate programs of an unorthodox nature; third, is what might be called sideways or horizontal articulation with the world of work; fourth is the more difficult type of articulation which takes place with the upper half of the four-year college or as the case may be, with a senior college; and fifth is a kind of inward articulation between that type of education which is career oriented and that which is called general education. Let us look a little closer at some of these ways in which we are trying to articulate at the present time.

First on the list is Operation Bridgeheads, which might be described as a total guidance program conducted by all of the six community colleges to inform high school students of the opportunities for further education offered by these two-year colleges of the City University and headed by Professor Irving L. Slade.

Under the title of "Pre-Tech," there has been a series of programs going on in the New York City Schools whereby students in the high schools, particularly in the vocational brackets are prepared for automatic admission to the community colleges.

An ad hoc committee on pre-technical programs, consisting of people from the New York City Schools and from certain aspects of the City University of New York was formed last summer. I would like to share with you some of the points which this committee believes to constitute a desirable set of guidelines for pre-technical education to be agreed to by both parties. Even though it sounds a bit formalistic, I think it is worth going into as an example of the kind of procedure necessary to bring together two enterprises as big as the schools of New York City and the community colleges of the City University.

First, an articulation committee on Pre-Technical programs should be organized on a continuing basis. At least four meetings per year were suggested.

Second. The definite criteria for the development of the pre-technical programs should be established.

Third. In order to protect the students once a program has been mutually agreed upon, notice be given two years in advance if either party decides to withdraw from the program.

Fourth. New pre-tech programs are added and old ones dropped only after mutual consideration by both parties.

Fifth. The centralization of the pre-tech program be achieved in a manner decided upon by both the high schools and the community colleges.

Sixth. That the administrative council distribute requests and receive commitments from the community college presidents. The important thing is that there is a written record available to all which is clearly understood by all concerned.

Seventh. Every effort should be made to have close correlation between the pre-technical program and job opportunities in the field. Development of new curricula should involve close discussion with industrial representatives. Involved here, too, are the co-op programs, of which the co-op arrangements at Borough of Manhattan Community College serve as a good example.

Eight. Counselors in high schools and community colleges be familiar with pre-tech programs in their own and in each others schools.

Ninth. Community Colleges should inform high schools of the kinds of people they are seeking in the career programs and a description of the levels of achievement necessary to succeed in these programs.

Tenth. A permanent committee composed of Board of Education and community college people be organized to consider the development of future pre-tech curriculums. This might take the form of a general steering committee or a series of ad hoc committees set up to consider pre-tech arrangements from the correlated curriculum tracks.

Eleven. The City University of New York should redefine its admission policy in light of the development of pre-technical programs.

And, finally, the necessity for on-going and spontaneous articulation between the Board of Education and the City University of New York was reaffirmed.

A redefining of our admissions policies (Number Eleven) leads into our next attempt at articulation--the College Discovery program. The College Discovery program as it operates at the Bronx Community College, for instance, involves students who desire a liberal arts oriented program but who do not satisfy the normal admissions requirements. Frequently they have deficiencies in mathematics, in English, reading, writing, and so forth. They are given very careful attention in terms of remedial work, but are gradually fitted into the liberal arts program that the regular students take. They are not identified at the college, the instructors in the regular courses do not know who they are, and they are given the same kind of treatment as all other students. But if they run into any difficulties, they relate back to their adviser who is the one person who knows them as special students and who then arranges individual attention as circumstances require.

These are students who did not qualify for regular admission, but through lighter programs, special counseling, and other things that the community college does for them, are ultimately able to integrate and compete favorably with the regular students and ultimately make a successful transfer to a senior institution.

There is a second prong to the college discovery program which involves the establishment of five development centers in school systems, each one of these acting somewhat like a school within a school, and characterized by small classes and tutorial sessions. Over 1,100 students are now involved in the program which is now in its second year of operation. Those who complete the program are guaranteed admission to a college within the City University.

Another approach to providing some sort of post-high school experience for all high school graduates within the City University is the so-called Educational Skills Center. This Center would provide both remediation for reading, writing, and arithmetic, and for personal counseling and guidance. Some of the programs might lead to jobs, while others might involve an adapter program. If a student did not show up well on tests, but felt that he was of college caliber, he would be allowed to try out a course or two at the college level. If he is truly a late bloomer, he can then move into regular college work.

One of the proposals growing out of a correlated curriculum arrangement is for a Health Careers Institute. Under such an arrangement, students may start thinking about preparing for health careers as early as the ninth grade and allowing for a full program development emphasizing this interest during the high school years. On the other hand, the Institute would also provide some type of vestibule program perhaps during the summer months whereby students lacking certain requirements could complete these in time to enter college in the fall with her class so to speak; or, depending on the nature of the need, enter in the middle of the year. The shortage of nurses is such that we will be having mid-year entering classes in one, two, and possibly three community college associate degree nursing programs in February of 1967.

The health careers institute could also provide a topping program in Laboratory Technology for graduates of community colleges, providing for both rounding out current graduates and for the means of up-ward mobility for in-service personnel.

These are some of the kinds of things that we think a good health careers institute would be involved in. In some cases it would offer its own courses, in other cases it would encourage existing colleges to develop a particular type of program, to carry out research, to provide guidance services, and to cooperate with educational service agencies not a part of the University.

Growing out of these various attempts at articulation is the usual manpower problem. Who's going to teach in community colleges? Educational Skills Centers? Health Careers Institutes? Are we going to go to the same usual sources of teachers that we have used at least for the liberal arts parts of community colleges? I'm not sure. We get some awfully good teachers from these sources, and we often get some superb teachers from actual employment. Perhaps if we would take good practitioners in a field, give them a special year's experience through seminars, observation, special curriculums, and thus encourage them to become teachers in those fields, we may have found one of the significant breakthroughs of the future.

Well, these have been some of the landmarks in the City University's attempts at articulation. I hope they have been helpful.

## CASE STUDY

## A STUDY TO DETERMINE A COMMON CORE OF THE CURRICULUM FOR COMMUNITY COLLEGE ELECTRONIC TECHNOLOGY PROGRAMS

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This study has been designed to gain information about the common core materials within the areas of Electronics and Mathematics for Electronic Technology programs at the community college level. The study attempted to answer the following questions:

1. What are the topics in the areas of Mathematics and Electronics that are perceived by a group of Educators and Industrialists to be essential for the Electronic Technician of today?

2. To what extent do the responses of a group of Educators to the topics in the areas of Mathematics and Electronics differ from the responses of a group of Industrialists to the same topics?

3. What are the topics in the areas of Mathematics and Electronics that are perceived by a group of Educators and Industrialists to be essential for the Electronics Technician of ten years from now?

4. Is there agreement between the responses of the Educators and Industrialists to the same questionnaire item as to the value of these topics?

5. What have been the past trends used to project possible future trends by the selected group of Educators and Industrialists who contributed the topics from which the questionnaire was constructed?

Procedure for the Study: The study was conducted in several steps:

1. Selection of the group of experts in curriculum content for the Electronics Technician program. This was based on the criteria established by the investigator.
2. Obtaining the topics in the areas of Electronics and Mathematics from the experts.
3. Construction of a 72 item questionnaire from the topics obtained from the experts.
4. Selection of the respondents. Two groups of respondents were selected:
    (a) The heads of community college Electronics Technology programs throughout the nation (184 community colleges and technical institutes were included).
    (b) The Heads of technical personnel in 167 electronics industries.
5. Pretest of the questionnaire
6. Mailing of the questionnaire to the remaining respondents.
7. Tabulation of data
8. Statistical treatment of the data
9. Survey of the literature
10. Establishment of recommendations and model curriculums based on the study results and survey of the literature.

## Construction and Format of the Questionnaire

The topics included in the questionnaire are those items that were most frequently mentioned by the group of experts. A total of 72 items (50 in Electronics and 22 in Mathematics) were selected.

In order to permit the investigator to test the Hypothesis of the study, each item within the questionnaire was made to require two responses. The first response, under the category of NOW, deals with the relative importance of that item in terms of the needs of the present day Electronic Technician. The second response for each item, under the category of 10 YEARS FROM NOW, is concerned with how important the respondent feels that same item will be for the Electronic Technician of ten years from now. In this way, every respondent was able to evaluate each item in terms of NOW and 10 YEARS FROM NOW.

In addition to requiring two responses to each question, every response had to be weighed by the respondent in terms of its relative worth. The scale of values used was:

3 very essential
2 important but less essential
1 of only limited value
0 unrelated or of no value

The response was made on a continuous type scale that was graduated from right to left from 0, 0.5, 1.0, 1.5, 2.0, 2.5 and 3.0.

## Finding Agreement and Differences between Responses (Now versus 10 Years from now)

This was an analysis of the educator and industrialist responses in an attempt to find those items in which a significant change in value had occurred. That is, those topics considered much more valuable and those topics considered much less valuable for the technician of ten years from now were identified. A t-statistic has been used to detect the significant differences in the values assigned to the NOW and the 10 YEARS FROM NOW responses of both groups of respondents.

The utilization of this t-statistic for the responses resulted in the identification of twelve electronics items that would be of less value and ten electronics items that would be of greater value for the technician of ten years from now.

It is interesting to note that a high degree of agreement was found between the educators and industrialists. They agreed that substantial curriculum changes should be made and even agreed as to the areas in which the changes should be made. This fact is reflected in the recommendations and model curriculum proposed in the study.

### Comparing Values of Educators Versus Industrialists

Ranking and the rank order coefficient were utilized to point out the high level of agreement found between the two groups of respondents. The four rank order coefficients, each comparing the educators versus the industrialists, are:

| | |
|---|---|
| Electronics NOW | .966 |
| Mathematics NOW | .990 |
| Electronics 10 YEARS FROM NOW | .971 |
| Mathematics 10 YEARS FROM NOW | .951 |

A t-statistic was also used to identify the items in which disagreement existed between the educators and industrialists. In the analysis of the NOW responses, significant disagreement was found in six items. There were only two items in the 10 YEARS FROM NOW category in which significant disagreement between the educators and the industrialists were found.

The analysis of all NOW and 10 YEARS FROM NOW responses with the educator values compared with the industrialists values by use of the t-statistics reinforced the results obtained from ranking. These findings were used as a basis for the selection of the common core topics.

## Recommendations

It is important to point out that agreement was found among the respondents that dealt with:

a. The topics needed for the present day technician.
b. The topics needed for the technician of ten years from now.
c. A curriculum change to meet the needs of the future technician.

## Selection of the Electronics Topics for the Curriculum

The electronics topics deemed as most important for the technician of 10 years from now are:

3. P-N Junction Diodes
4. Tunnel and Zener Diodes
5. Silicon-controlled Rectifiers
7. Transistors (PNP and NPN)
11. Current in solid state devices
12. E-l Characteristics (Diode and transistor)
14. Dynamic parameters of electronic devices
19. Transistor multivibrators (bistable, astable, monstable)
25. NAND logic circuits
26. NOR logic circuits
27. Techniques for triggering, gating, synchronization
29. Techniques for storing and comparing
31. Transistor amplifiers

41. Feedback effect on gain, bandwidth, noise, stability and output impedance

49. Filters (R-C,R-L,L-C and multiple-section)

50. Regulated power supplies

## Rejection of all vacuum tube related topics from the curriculum

Examination of the groups of t-tests for the educator responses, industrialists responses, and finally the combined educator-industrial lists responses, conclusively point to the declined value of those topics dealing with vacuum tube devices and vacuum tube circuitry. The items rejected are:

1. Vacuum diodes
2. Gas diodes
8. Multigrid vacuum tubes
10. Thermionic emission
13. E-I Characteristics (multi-grid vacuum tube)
20. Blocking oscillators (tube)
22. Schmitt trigger (tube)
30. Triode and multigrid vacuum tube amplifiers
37. Cathode followers
40. Plate-grid feedback

## Selection of the Mathematics Topics for the Curriculum

The mathematics items agreed upon by both the educators and the industrialists as those needed for the future technician have been recommended to be the core topics for the mathematics portion of the program. These topics are:

51. Introduction and Review (decimals, powers of ten, units, dimensions, significant figures, estimation).

52. Simple Linear Equations: use of formulas in solving scientific problems, expressing word problems as equations, review of basic algebraic laws, solving simple problems with formulas and linear equations.

53. Algebraic Processes: rules for algebraic processes, literal numbers, factoring, special products, fractions, powers, roots, fractional exponents, ratio and proportion, variation, operations with radicals.

54. Elementary Topics in Geometry and Trigonometry: angle measurement, the circle and related problems, the trigonometric functions, solution of right triangles by trigonometry, simple trigonometry equations.

55. The Slide Rule: Multiplication, division, ratio and proportion, powers and roots, trigonometry.

71. Application of Number Systems: Computer math and applications, the analog computer and applications, digital computer and applications, basic programming techniques.

72. Logic Systems: Introduction to boolean Algebra, addition and multiplication facts, truth tables, switching circuit algebra, AND-OR logic functions.

### Determination of the curriculum's Academic Level

It is recommended that the prerequisites for admission to the electronic technology program be that the student have:

1. One year of high school algebra (or equivalent)
2. An interest in the field of electronics.

The mathematics topics chosen as being most essential verify this recommendation.

Such an approach would be in keeping with the idea that the technician is within the middle-level type of job category and therefore should be attainable by youth of middle-level academic abilities.

## RECOMMENDATIONS FOR MODEL CURRICULUMS

### The Middle Level Model Curriculum

| Semester | Course | Hours (S.H.) | Selected topics covered |
|---|---|---|---|
| 1 | Electronics I | 3 | 3, 4, 5, 12 |
| | Elec. Principles I | 5 | |
| | Mathematics I | 3<br>11 | 51, 52, 53, 55 |
| 2 | Electronics II | 3 | 7, 11, 12, 14 |
| | Elec. Principles II | 5 | |
| | Mathematics II | 3<br>11 | 53, 54, 55 |
| 3 | Electronics III | 6 | 19,31,41,49,50 |
| | Mathematics III | 3<br>9 | 71, 72 |
| 4 | Electronics IV | 5 | 25, 26, 27, 29 |
| | Electronics Specialty | 3<br>8 | |
| | Total | 39 S.H. | |

It should be noted that a typical associate degree program contains a minimum of 60 S.H. Therefore it can be seen that more than 20 S.H. have been left for the other courses in the program. The investigator cautions against the use of the model as the curriculum per se. The model curriculum, if used in conjunction with recognized principles of sound curriculum planning, can serve as one of the bases for the development of a viable Electronics Technology program. About ninety per cent of the programs should be at this level.

The Upper Level Model Curriculum

| Semester | Course | Hours (S.H.) | Questionnaire item covered |
|---|---|---|---|
| 1 | Electronics I | 3 | 3, 4, 5, 12 |
| | Elec. Principles | 5 | |
| | Mathematics I | 4 | 51,52,53,54,55 |
| | | 12 | |
| 2 | Electronics II | 3 | 56, 57 |
| | Elec. Principles | 5 | |
| | Mathematics II | 4 | 58,59,60,61,62<br>63,64 |
| | | 12 | |
| 3 | Electronics III | 6 | 19,31,41,49,50 |
| | Mathematics III (A) | 3 | 65, 66, 67 |
| | Mathematics III (B) | 2 | 70, 71, 72 |
| | | 11 | |
| 4 | Electronics IV | 5 | 25, 26, 27, 29 |
| | Mathematics IV | 4 | 68, 69 |
| | | 9 | |
| | Total | 44 S.H. | |

A total of 44 S.H. out of the usual 60 S.H. is allocated to the areas of Electricity, Electronics and Mathematics. Therefore at least 16 S.H. would be available for the other courses in the program. The investigator cautions against the use of the model as the curriculum per se. The model curriculum, if used in conjunction with recognized principles of sound curriculum planning, can serve as one of the bases for the development of a viable Electronics Technology program. About ten per cent of the programs should be at this level.

## ATTRACTING STUDENTS TO THE ELECTRONICS TECHNOLOGY PROGRAM

### Enrollment and Graduation Data

The material gathered by Brunner (5) provides data concerning enrollment graduates, and attrition rates of the electronic technology programs on a national level. These institutions, according to Brunner,[1] graduated 3627 electronic technicians in June of 1962. Full-time enrollment in these same institutions in October of 1962 was 13,250. Also of interest because of its implication for the manner in which programs are offered, is that 12,591 students were enrolled in electronic technician programs on a part-time basis. It should be noted that these institutions, as a whole, had as many part-time students as full-time students enrolled in electronic technology curriculums.

Brunner's data also shows that the typical class in the electronic programs is small, with a mean of about 68 students. Also seen from his data is that the average graduating class of electronic technicians had a mean of just under 20 students in June of 1962. This is an attrition rate of about 70 per cent. Therefore only three out of ten of the very limited number of students that enroll in electronic technology programs succeed in completing the two-year course of study. Both the initial small enrollment figures and the high attrition rate warrant additional consideration.

It should be pointed out that the relatively small enrollments extend to all engineering technician programs, as indicated by the results of the survey conducted by Donald C. Metz.[1] With regard to this, Metz said:

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[1] Ken August Brunner, Guide to Organized Occupational Curriculums in Higher Education, Washington, D.C., U.S. Department of Health, Education, and Welfare, 1965. Pp. 27-29.

> Although it is surprising that there has been no substantial change in the total enrollments and graduates of engineering technology programs, the data showing a lack of new students certainly is cause for alarm if there is as great a need for engineering technicians as all information seems to indicate.

A study conducted by the National Science Foundation has indicated that there will be a seventy per cent increase in the number of technicians required by industry during the decade from 1960 to 1970.[2] This study also had something to say about trained technicians, many technician positions are filled by individuals who have had no technician type education. The National Science Foundation study stated:[3]

> Many technician jobs are filled by college drop-outs, engineering and science students working part time, and skilled workers who have enough knowledge of mathematics and science.

Leland Medsker conducted a study several years ago that helped point out the lack of attractiveness of many occupational type curriculums. The electronic technology curriculum falls within this category because it is generally a non-transfer type of program whose main objective is to prepare the graduate for entry into industry. Medsker said:[1]

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[1] Donald C. Metz, "Eighth Survey of Engineering Technician Programs," An article in Technical Education News (September 1963), New York, McGraw-Hill Book Company, 1963. Pp. 13-14.

[2] National Science Foundation, Scientists, Engineers, and Technicians in the 1960's, Washington, D.C., U.S. Department of Labor, 1963. P. 8.

[3] *Ibid.*, P. 27.

> Administrators, counselors, and teachers in most of the two-year colleges visited agreed that no matter how hard an institution endeavors to effect a terminal occupational program, it is difficult to interest students in the program except in highly specialized institutions. One reason for this difficulty is the prestige values that pertain to "regular" college work. Students and parents tend to place high social values on education leading to a baccalaureate degree, even if they know that attaining such a degree is unlikely. One might even presume that such an attitude would cause students not in terminal vocational programs to look down on those who are, but happily this did not appear to be true in the institutions visited. The principal explanation for small enrollments in terminal offerings seems not to be a disdain for occupational training but simply a cultural factor that causes students to covet the reputation of being a preparatory student. Undoubtedly, too, many cling to the transfer program even when they know they may need soon to go to work because they think that some day they may be able to pursue a degree--as well they may. Unfortunately, too, many students were not informed in high school about terminal programs and the occupations to which they lead, and thus have not had the occasion to become interested in such programs when they entered the junior college.

Grant Venn concurs with some of Medsker's findings.[2]

Several attempts to find ways of attracting qualified people to technician programs have been made. Michael J. Reynolds J. Reynolds has proposed opening the door to a B.S. degree for technician students.[1] A supporter of the view taken by Reynolds is William Hershcopf of Nassau Community College.[2]

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[1] Leland L. Medsker, The Junior College: Progress and Prospect, New York, McGraw-Hill Book Company, Inc., 1960. P. 113.

[2] Grant Venn, Man, Education, and Work, Washington, D.C., American Council on Education, 1964. P. 34.

Many of the technical educators oppose such innovative ideas about changing the curriculum in technician programs. A typical reaction against offering baccalaureate programs to technicians is the one made by Donald W. Brown, director of Oklahoma State University's Technical Institute at Stillwater. Brown made the following comment with reference to such a program being inaugurated at San Francisco State College:[3]

> I sincerely hope that San Francisco State College had some reason other than just to grant a bachelor's degree to technicians when it initiated this program. We all realize the status connected with the bachelor's degree; however, if the major purpose of granting such a degree is to satisfy a status requirement, that's about all the degree will do for the technician.

Because of the continued controversy over this issue, baccalaureate programs for qualified technicians may come about slowly in many states.

## High Attrition Rates

The high attrition rates associated with most of the electronics curriculums, as evidenced by the data compiled by Brunner, the National

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[1] Michael J. Reynolds, "Let's Diversify Technical Education," Junior College Journal (April, 1965), Pp. 14-15.

[2] William Hershcopf, "Are we producing overspecialized Technicians?" Technical Education News (March, 1965), P. 23.

[3] Donald W. Brown, "Overspecialized Technicians?" Technical Education News (June, 1965), P. 22.

Science Foundation, The American Society for Engineering Education, and Metz, is believed to be due in great part to the rigor of the programs.

The high attrition rates presently so common in many community college level technician programs is beginning to cause considerable concern in many quarters. One outcome of this concern, it is hoped, will be research aimed at finding solutions to the problem.

Lately, there appears to be some increasing interest in attempting to learn more about the students entering the technician type curriculum. Evidence of this is shown by the position taken by Bossone.[1] Hoyt[2] conducted an experiment along this line in which he attempts to predict the college ability of students in terminal-occupational curriculums in certain community colleges selected by him in six states. Several of his findings relate to this analysis of attrition in technical programs. Hoyt said:[3]

> . . . Compared with all other college students, the academic potentials of these students were consistently below average . . . Compared with all junior college students, the occupational-terminal sample was somewhat below average.

## CONCLUSIONS

The preceding statements indicate that several forces are working against one another. While there is a demand for high-level electronic technicians in modern day technology, there are severe problems associated with both the recruitment of students and in graduating them from such curriculums. The cultural factor cited by Medsker, Venn, and many others presently serves as a very real obstacle to attracting students to most types of occupational programs. The problem, in electrical and electronic technologies, is further compounded by the fact that students of relatively high technical potential (as evidenced by their strong background in mathematics and natural sciences) are desired for this type of program. This point has been strongly made by Dobrovolny,[1] The American Society of Engineering Education,[2] and others. However, the type of student being sought for these high-level programs is very often more interested in four-year type curriculum and quite often cannot (and perhaps should not) be counseled into a two-year non-transferable technician type program.

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[1] Richard M. Bossone, "Understanding Junior-College Students," The Journal of Higher Education (May, 1965), Pp. 279-282.

[2] Donald P. Hoyt, "Predicting Grades in Two-Year Terminal Programs," Junior College Journal (February, 1966), P. 21.

[3] Ibid.

The rigor of such curriculums, in spite of the fact that they attempt to recruit students that have relatively high levels of abilities in mathematics and natural sciences, is probably the major factor behind the high attrition rate of 70 per cent. Therefore it is seen that a two-pronged problem exists: First, it is difficult to attract students to such curriculums; and second, it is difficult to get them to graduate once they are enrolled.

Are there possible avenues toward solving this difficult problem? It should be recognized that not more than ten per cent of the electronics technicians need be at the level described by Dobrovolny and the American Society of Engineering Education. This was indicated by Bent[1] in his study of technicians in certain California industries and also by the results of this study. In both studies, it was shown that mathematics at the level of applied trigonometry is adequate for most technician positions.

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[1] Jerry S. Dobrovolny, Electronic Technology: A Suggested Two-year Post-High-School Program, Urbana, Illinois, University of Illinois, 1964.

[2] American Society for Engineering Education, Characteristics of Excellence in Engineering Technology Education, Urbana, Illinois, University of Illinois, 1962.

But some technicians are needed at that high level (about 10 per cent), where mathematics beyond trigonometry is needed. How can students of high ability be attracted to these programs? Students could be more readily attracted to the high level technician programs by heeding the advice offered by Reynolds. He stated that the two-year college level technician program should be the first half of a B.S. degree in Technology. In order to have such a proposal succeed, provisions should be made with certain four-year institutions to provide for these programs. Articulation should take place with no loss of credit. Students of relatively high mathematics ability can be attracted to a high level technician program only when it leads to a baccalaureate degree. If such provisions are not made, then students will be drawn to baccalaureate programs in other fields.

The remaining ninety per cent of the nation's electronic technicians should be graduates of two-year programs of reduced academic rigor. This study is concerned primarily with that type of program. The results of this investigation point to the fact that mathematics up to the level of trigonometry is considered adequate for the present day technician and also for the technician of ten years from now. Such a finding has a very important implication with regard to both the enrollment and attrition problems cited in an earlier paragraph. Students with a mathematics background of one year of high school algebra (or equivalent) and an interest in electronics should be permitted to enroll in the program. These students, with an average amount of study and application, should have a reasonably good chance of graduating and becoming useful technicians. Opening the doors of the program to this middle level student, along with efficient community distribution of information pertaining to the program offerings of the college, could make a significant difference in the number of students that can be enrolled in these programs.

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[1] Ralph D. Bent, "Technicians in the Electronics and Aerospace Industries," Technical Education News (March, 1965).

## CASE STUDY

# ARTICULATION ISSUES IN SECRETARIAL PROGRAMS

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### Introduction

Business is intricately involved in almost all human activity. The business programs are the most frequently found of the occupational-technical programs both in our comprehensive high schools and in the two-year colleges. The increasing specialization of these programs parallels and is a direct result of the increasing complexity of our business world. Among the programs experiencing this impact is the secretarial program.

In 1950 there were 781,324 female secretaries employed in the United States; by 1960 this number had increased to 1,451,639 or nearly doubled.[1] The continued increase in business activities today presages a corresponding extension of this trend. Just a glance at the "Help-Wanted" columns of any metropolitan daily newspaper will verify the many attractive opportunities available to qualified secretaries.

Individuals wishing to prepare for careers in the secretarial occupations usually obtain their specialized training in high schools, vocational schools, two- or four-year colleges and universities, or a combination of these. The usual minimum requirement for initial employment in a secretarial occupation is high school graduation; for advancement, or for initial entry at a higher level, additional preparation is usually required. For the top positions in the secretarial field, a college degree is almost mandatory.

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[1] Eleanor Maliche, "Changing Patterns in Office Work," Business Education Forum, (February, 1966), p. 16.

The variety of different job levels and correspondingly different requirements for each combined with the various educational levels at which training for them may be obtained raises serious issues. The President's Commission in 1947 recommended that the possibilities of closer articulation between high schools and the colleges, both two- and four-year, be explored.[1] Anderson has referred to this area thus: "One of the great wastes in the education of many college secretarial students is the failure of the high schools to coordinate their work."[2] It is our purpose here to examine some of these issues constructively with the view toward possible future recommendations for action, or for further research and exploration.

## ISSUE I

### The Place of Secretarial Programs in the Educational Structure

According to Place, "Some community college business programs look very much like transplants from secondary curriculums."[3] Hodges declared that there exists a great deal of . . . "confusion and even conflict among various groups of business educators as to what business education content should be taught at the high school level, what should be taught in junior colleges, and in our colleges and universities."[1] He indicates that there is a heavy overlap of course offerings in these levels. These charges and conflicts outline our first issue--the place of secretarial programs in the educational structure. The following questions will help to focus the issue more sharply:

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[1] *President's Commission on Higher Education: Higher Education for American Democracy, Volume III: Organizing Higher Education*, Washington, D.C., Government Printing Office, 1947, Chapter 2, Pp. 5-23.

[2] Ruth I. Anderson, "Desired Outcomes for the Building of a Foundation for Advanced Study in Secretarial Subjects," Chapter 8 (Pp. 240-252), *New Perspectives for Education for Business*, Crank and Crank, eds., Washington, D.C., National Business Education Assoc., 1963, p. 245.

[3] Irene Place, "Community (Junior) Colleges," Chapter 16 (Pp. 151-163), *Business Education Meets the Challenges of Change*, Lanham and Arensman, eds., National Business Education Yearbook, No. 4, Washington, D.C., National Business Education Association, 1966, p. 155.

(1) Should all such highly skilled training be up-graded to the post-secondary educational units, leaving the high schools to develop a broad general education for living?

(2) Should the initial skill development (shorthand and typewriting) be presented in the high school, leaving the polishing and sharpening of these skills to be developed in the post-high school institutions?

(3) Should we continue to offer complete secretarial programs in both institutions (high schools and post-high school institutions) according to "community needs"?

Some critics ask the question: Shall we continue to take valuable time from the over-burdened high school curriculum to teach a highly specialized occupational program, or could the vocational schools and two-year colleges do the whole job more effectively and efficiently? While some authorities recommend relegating all specialized occupational education to the post-high school institutions. Conant, in his report on the American high school, strongly defended the nonacademic elective programs in our comprehensive high schools as being . . . "composed of meaningful sequences of courses leading to the development of marketable skills, rather than a hodgepodge of miscellaneous subjects."[1] He further pointed out that even those students in a vocational program devoted half their time to academic subjects, and also that many such students displayed a serious commitment not only to the vocational subjects but to their whole program as well.[2]

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[1] Richard B. Hodges, "Solving Clerical Shortages Through Cooperative Effort," Business Education Forum, (December, 1960), p. 40.

While authorities seem to be rather evenly divided on the issue, increasing pressure on the high school curriculum and rising costs of the vocational schools and two-year colleges may make a reappraisal of the place of secretarial programs in our educational structure inevitable.

## ISSUE II

### The Secretarial Curriculum

In our rapidly changing business world, it is both inevitable and gratifying that the secretarial curriculum continues to be an issue of great concern to business teachers, educators, and employers. The constant threat of obsolescence through automation serves as a watchdog to keep the secretarial programs vital and up to date.

The Administrative Handbook for Business and Distributive Education of the New York State Department of Education recommends two stenographic curriculums for high schools both of which include the courses: Introduction to Business, Shorthand I and II, Typewriting,

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[1] James B. Conant, The American High School Today, New York, McGraw-Hill Book Company, Inc., 1959, p. 30.

[2] Ibid., p. 32.

Transcription, Business Law, and Secretarial Practice.[1] These courses suggest a primary concern with developing the basic skills in shorthand, typewriting, and transcription.

Secretarial curriculums in the two-year colleges, in addition to the basic skill development subjects, usually include specialized programs under such titles as Medical Secretarial, Dental Secretarial, Legal Secretary, and Executive Secretary. These two curriculum patterns (high school and two-year college) indicate that generally the high school secretarial program prepares students with basic skill development for initial job entry, while the two-year colleges prepare secretarial personnel for advancement through increased specialization, and for supervisory and managerial positions.

The individual courses in the secretarial programs are under constant pressures. From time to time we have heard the cry, "Shorthand is dead; the typewriter is obsolete; bookkeeping will soon be completely automated"--and therefore the teaching of these subjects should be eliminated from the curriculum! And yet, as Tonne notes in this connection, ". . . all you have to do is look at the endless lists of stenographers-and-secretaries-wanted [pardon me 'gal Fridays' and executive assistants] and note that shorthand is still the best skill for a girl who wants a job at high school graduation."[2]

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[1] As reported in the Syllabus and Teaching Handbook for Courses in Shorthand 1, Shorthand 2, Transcription, and Personal-Use Shorthand, The State Department of Education, Bureau of Business and Distributive Education, Albany, New York, The Department, 1963, p. 8.

[2] Herbert A. Tonne, "Nonsense About Automation," The Journal of Business Education, Vol. 35, No. 5 (February, 1960), Pp. 208-209.

Tonne also asks, "What has happened to the wonderful invention that the Germans were supposed to have developed during the War (W.W. II). . . into which one would talk one's letters and out of which at the other end a perfectly written typed letter would come?"[1] Now, some twenty years later, this concept still appears to be only in the research stage.[2] There is increasing pressure for courses in the key punch, programming, electronic data processing, and computer techniques to be added to the business curriculum (either required or elective for secretarial majors). These courses are being operated in some high schools and in many two-year colleges, but they are costly and many employers prefer to train their own personnel on the job in these areas.

The future of the secretarial curriculum will continue to be an issue of great concern to serious educators. The advent of automation will, indeed, bring many profound changes; but, as Mary Ellen Oliverio points out, "It is important that the business teacher assess the changes with calmness and intelligence."[3] This is the atmosphere of constructive curricular appraisal.

## ISSUE III

### Teaching Methods in Secretarial Programs

The New York State Education Department exerts important leadership in guiding theory and in teaching secretarial subjects in the high schools through its Syllabus and Teaching Handbook in which up-to-date methods are carefully delineated, and innovations are suggested, together with a careful documentation of what authorities in the field have to say about each.[1] In contrast, teaching methods in many post-high school institutions differ widely with individual instructors. Indeed, it is the essence of academic freedom that the instructor in higher education be free from any limiting factors when he is engaged in the legitimate pursuit of truth (teaching) in the classroom. It is this sharp contrast in methods of teaching that defines our third issue.

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[1] Herbert A. Tonne, "Nonsense About Automation," The Journal of Business Education, Vol. 35, No. 5 (February, 1960), p. 209.

[2] For instance, see description of research on such a machine at R.C.A. as reported by Ellison Smith in The New York Herald Tribune, Friday, May 25, 1962, Sec. 2, Page 21, Column 1.

[3] Mary Ellen Oliverio, "Social Change and Business Education," Business Education Forum, XIV (January, 1960), p. 10.

Very often students who have just entered two-year colleges are quite bewildered and confused by the abrupt change from the regular daily lesson type of teaching to which they were accustomed in high school. Now they are more dependent upon themselves to determine their daily study plan since assignments are more broadly conceived and less finely outlined for them. They have been conditioned to think only in terms of neatly sliced and wrapped packages of daily learning; to think in terms of whole chapters and comprehensive examinations is awesome to them. This type of contrast is especially true of the skill subjects in the secretarial programs, and the secretarial student having only a limited experience in academic methods in high school is often the least able to cope with the new methods in the two-year college.

In addition, many two-year colleges are very reluctant to coordinate teaching methods, other than in a general way through department meetings and consultation with the dean, in order to maintain an atmosphere of academic freedom and initiative for innovation. Typical of this concept is a special note which appears in the objectives of one teacher's manual for Legal Secretary:

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[1] Syllabus and Teaching Handbook for Courses in Shorthand 1, Shorthand 2, Transcription, and Personal-Use Shorthand, The State Department of Education, Bureau of Business and Distributive Education, Albany, The Department, 1963.

> "Many instructors are ingenious in their use of innovations on standardized teaching materials. Some instructors can move the instruction process more rapidly than others. Instructors like these had best not be regimented or restricted by an inflexible program of lesson plans. This manual, therefore, is only a general guide for teaching the skills and information necessary to the legal secretary."[1]

The issue really involves the basic characteristics of our different levels in the educational structure, and might be summarized by asking the question: What changes or modifications of teaching methods in both the high schools and in the two-year colleges could be implemented that might make the transition for students less bewildering, smoother, and more efficient?

## ISSUE IV

**Standards of Achievement in Secretarial Programs**

Agreement by business educators on what should be accomplished by high school students at the end of each semester of a secretarial curriculum has never been achieved. Standards for Secretarial courses are derived from such sources as The Regents' Examination, The State Education Department Syllabi, individual school standards, NOMA, and from businessmen and business organizations in the community. That many of these sources have different standards of achievement is our fourth issue.

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[1] Legal Secretary: A Teacher's Manual, California State Department of Education, Business Education Series, Sacramento, The Department, 1963, p. 3.

The issue is complicated by several factors. References to community standards is ambiguous, since the community for the high school is often quite different from the community for the two-year college. In addition, it is rather apparent that quite a few employers do not have a clear conception of what their needs are, often demanding, for instance, an expert in shorthand to fill a job in which dictation is only occasionally utilized. In another instance, the local branch of a well-known firm had a long-term indoctrination period for new secretarial employees during which little shorthand was required. At the end of this period the high-level shorthand skill attained at the end of two years of intensive work in high school or in a junior college has, of course, eroded badly--and this firm is thus concerned with the poor quality of today's beginning secretarial employees!

Another complicating factor is mentioned by Kastner who suggests the possibility that quite stringent academic requirements might be even more important for technical students in the two-year colleges than for transfer students because those who complete only two years may be forced to compete with college graduates (four-year) for jobs in all but the most technical and specialized areas.[1]

The New York State Education Department Syllabus on shorthand indicates that disagreement about standards is a healthy situation for it encourages innovation, provides motivation to do better and better, provides for flexibility in the curriculum and in teaching methods, and encourages research in determining what are the most desirable goals.[2]

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[1] Harold H. Kastner, Jr., "Student Deficiencies and the Community College Dilemma," Junior College Journal, 30:140-142, November, 1959.

[2] SUNY, Syllabus and Teaching Handbook, p. 29.

The issue of varying standards in the secretarial field remains a major bewilderment to students, teachers, and employers; the issue is especially acute at the point of high school graduation and two-year college entrance. It continues to be a problem with many faces, and few solutions.

## ISSUE V

### Student Selection in Secretarial Programs

In the high schools the decision to pursue a secretarial program is largely an economic one. Students from families of modest financial resources realistically choose the secretarial program as a means of preparing themselves to help with the family financing in the earliest possible instance. On the other hand, selection of students within the business department for the secretarial program is almost largely on the basis of the abilities they display. Thus the brightest business students pursue the stenographic curriculum, while those of more modest ability elect the clerical curriculums. In the post-high school institutions selection is far more complicated, but in the majority of cases the reason students elect to take secretarial courses still remains an economic one.

Our fifth issue, then, may be defined by these questions: Should the secretarial program be available to anyone who wishes to try it? Or should the teacher have the right to select students on the basis of prerequisite grades, aptitudes, and personality factors? Anderson reiterates that . . . "In too many high schools, students are passed on the basis of such factors as willingness to work, personality and attendance, with not much attention given to performance."[1] These students then become a part of the selection problem at the two-year college level.

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### Summary

It has been our purpose to examine several articulation issues in secretarial programs. We have described the differing levels at which secretarial programs are offered in our educational structure; we have pointed out some problems in secretarial curriculums; we have indicated some of the problems that arise from the varying teaching methods used in high schools and two-year colleges; we have exposed the existence of varying standards of achievement; and finally, the selection of students in these programs has been scrutinized.

It is at this point that possible recommendations for future action can be profitably considered.

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[1] Ruth I. Anderson, "Desired Outcomes for the Building of a Foundation for Advanced Study in Secretarial Subjects," Chapter 8 in New Perspectives for Education for Business, Crank & Crank, eds., Washington, D.C., National Business Education Association, 1963, Pp. 240-252. (p. 245).

# RECOMMENDATIONS

Following each of the major presentations, conference participants formed discussion and reaction groups to consider, discuss, and evaluate the materials, suggestions, guidelines, and ideas given to them by the speakers. The primary objective of the discussion groups was to make recommendations concerning articulation practices between high schools and two year colleges.

The leadership in the groups was provided by Bernard F. Corbman, Nathan Goldfarb, Louis B. Lambert, and John E. Zott.

## I.

Recommendations based on a summary of a report made by Bernard F. Corbman, Chairman, Business Education Department, Bronx Community College.

1. Community colleges were placing an undue emphasis on the academic background of high school students as prerequisites to admission. This emphasis has resulted in insufficient opportunities for students interested in or capable of vocational-technical education at the community college level.

2. While programs such as College Discovery, Operation Second Chance, and Operation Bridgeheads represent good moves in the direction of helping the underachiever in high school gain further education, the effort has been minimal in terms of numbers of students affected. These efforts should be expanded.

3. Overlapping of course content at the high school and community college level is not inherently bad. The basic question is whether or not there is a rational explanation for the overlap. Research is needed in the area of curriculum content in the various institutions offering vocational-technical programs.

4. Model programs should be developed illustrating the best possible articulation practices that could exist between high schools and two year colleges, and two year and four year colleges. These model plans should be developed for different regions of the State rather than one grand state-wide plan, to take cognizance of regional differences. The models could be formulated by a group such as the one represented at the Greyston Conference.

5. Several specific techniques could be incorporated into the model articulation program:

a. Examinations could be prepared which would test the ability of students entering certain technical subjects in the community colleges. Passing of the examination would allow the student to move on to the next level without having to repeat a great deal of material.

b. Set up formal procedures so that faculties of both the high school and community college could meet with each other.

c. Expand the pre-tech approach at the high school level.

d. Follow up procedures of high school graduates should be maintained on a regular basis. The follow up studies should attempt to find out the students that were admitted into programs, the students that have been turned down, the reasons for non-admissions into programs, the problems encountered by students in community college courses, and other materials in regard to the students and the program. Of course, the information gained should be utilized. The follow up studies should be joint studies and the feed back should not only reach the administrators but to the entire faculties.

## II.

Recommendations based on a summary of a report made by Nathan Goldfarb, Director, Computer Center, Hofstra University.

1. The community colleges of New York State should use their campuses as a meeting place for the local vocational high schools and on a continuing basis, discuss their programs and work out curriculums.

2. There is great need for research in the area. Some suggested projects:

a. Trends in admission policies in the community colleges .

b. The changing nature of the technically oriented student body.

c. The place of the comprehensive community college versus the specialized Fashion Institute of Technology approach.

d. The whole question of public relations and the problem of building a better image for vocational-technical education.

e. The place of the vocational high school in continuing occupational education.

3. An articulation model should be established and used for research purposes. Computerizing the model would allow experimentation to be performed with changing variables put into the system.

## III.

Recommendations based on a summary of a report made by Louis B. Lambert, Research Associate, Electronics Research Laboratories, Columbia University.

1. A five to ten year follow up study should be started of technical high school graduates and community college graduates in

an attempt to answer such questions as:

a. What percentage of the students entering college from the vocational and technical high schools actually complete their college education?

b. What were the entry jobs of students from the vocational and technical high schools and the community colleges? What were their jobs five and ten years later?

c. During the period of time that the graduates of the vocational and technical programs were working, what additional education did they receive, both formal and informal? How is this additional education or lack of it related to promotion on the job?

2. Another study recommended is a study of the curriculums in the vocational and technical education area in the high schools and community colleges in an effort to discover the extent of overlap in programs.

3. Funds should be secured to support further research in the area of technical education and to support an ongoing steering committee that would organize continuing articulation conferences.

4. Funds should be secured to support research that would eventually develop articulated technical programs ranging from grade 10 through grade 14.

5. Research should be conducted that would attempt to find the place of the vocational high school in the pattern of American education.

## IV.

Recommendations based on a summary of a report made by John E. Zott, Chairman, Vocational and Technical Education Department, Sewanhaka High School.

1. There should be an integration of the programs offered at the high school level and at the community college level, particularly in vocational education. The job analysis approach, which was used many years ago, offers a technique for providing data for better integration of program.

2. Recommended research:

   a. Definition of terminology

   b. Opportunities for the low academic and high ability vocational student.

   c. Criteria to measure the effectiveness of the programs in the high school and the community college.

3. In spite of the advances we have made in vocational-technical education to date, most of it has been to the advantage of the boys and very little has been done for the girls. Programs should be developed in the vocatiomal-technical area for girls.

# APPENDIX A

## THE QUESTIONNAIRE

## APPENDIX A

## ACCOMPANYING LETTER

Among the many issues of concern to educators in the State of New York is that of articulation between high schools and two-year colleges. I am conducting a preliminary project for the Center for Urban Education to help identify and suggest ways to improve present articulation of business and engineering related technological programs in high schools and two-year colleges.

I believe you would be making a real contribution to the field of vocational technical education if you would take a few minutes out of what must be a very busy schedule to see that the enclosed questionnaires are filled out and returned to me as quickly as possible. As you can see, there are separate questionnaires to be filled out by the heads of your business, mechanical and electrical technology programs. There is a very general question to be answered by the president and/or dean (superintendent and/or the principal).

I assure you that the information will be treated as confidential and that in the final report, institutions will not be identified.

Please return the completed questionnaires to:

Dr. Michael Brick
Associate Professor of Higher Education
Teachers College, Columbia University
525 West 120th Street
New York, New York 10027

Thank you very much.

Sincerely yours,

Michael Brick
Associate Professor
of Higher Education, and
Associate Director, Center for
Community Colleges

MB/er

Encls.

# GENERAL QUESTION ON ARTICULATION

## TO BE FILLED OUT BY PRESIDENT AND/OR DEAN

### I. Identifying Information

Name of college or school__________________________

Form completed by________________Title_____________

### II. Question

What are some ways in which your college and the high schools are at present carrying out articulation activities in business and engineering related technologies?

Could you suggest ways to develop improved techniques of curriculum and student articulation between secondary schools and two-year colleges in business and engineering related technologies?

(Similar general question sent to high schools to be filled out by Principal or Superintendent of Schools).

# MECHANICAL TECHNOLOGY QUESTIONNAIRE

NOTE: To be filled out by Chairman, Mechanical Technology Department.

Please fill out the enclosed questionnaire as completely as possible. Wherever you think you may wish to expand on your statements, please feel free to attach additional comments. As soon as you have completed the questionnaire, please return it to:

Dr. Michael Brick
Associate Professor of Higher Education
Teachers College, Columbia University
New York, New York 10027

Thank you very much for your cooperation.

### I. Identifying Information

Name of College or school__________________________

Address__________________________________________

Form Completed by_____________Title_______________

Name of Program___________________________________

## II. Student Information

1. Are there any special admission requirements for students entering the program or is admission to your program basically open door?

   Any special mathematics prerequisites?____________

   Any special science prerequisites?_______________

   Any special test scores or minimum standing in high school class?_____________________________

   Note: If answers to any of above questions are yes, please give specific requirements.

2. Would you characterize the students entering your program as:

   _________Above average in academic ability

   _________Average in academic ability

   _________Below average in academic ability

3. Do you use your program to place students with low ability?

4. Could you describe the high school backgrounds of the students in your program? For example, do they take an academic program, a general program or a vocational program in high school?

## III. The Curriculum

1. Describe important and innovative features of your program. (Any descriptive attachments would be appreciated).

2. What entry job or cluster of jobs is the student prepared for by the program?

3. What are the implications of the curriculum in mechanical technology for vocational and general education preparation at the high school?

## IV. General Question

1. What are the general purposes or objectives of your program?

2. What changes in secondary school philosophy and practice would help your institution and your program better meet their goals?

(The same questionnaire was sent to chairmen of the electronics Technology Department, Secretarial Department and Retailing Departments in community colleges).

# MECHANICAL TECHNOLOGY QUESTIONNAIRE

Note: To be filled out by Chairman, Mechanical Technology Department.

Please fill out the enclosed questionnaire as completely as possible. Wherever you think you may wish to expand on your statements, please feel free to attach additional comments. As soon as you have completed the questionnaire, please return it to:

Dr. Michael Brick
Associate Professor of Higher Education
Teachers College, Columbia University
525 West 120th Street
New York, New York 10027

Thank you very much for your cooperation.

## I. Identifying Information

Name of school____________________

Address____________________

Completed by________________ Title__________

Name of Program____________________

## II. Student Information

1. Are there any special admission requirements for students entering the program?

   Any special mathematics requirements?__________

   Any special science requirements?__________

   Any special test scores or I.Q.?__________

   Note: If answers to any of the above questions are yes, please give specific requirements.

2. Would you characterize the students entering your program as:

   __________Above average in academic ability

   __________Average in academic ability

   __________Below average in academic ability

3. Do you use your program to place students with low ability?

## III. The Curriculum

1. Describe important and innovative features of your program. (Any descriptive attachments would be appreciated).

2. What entry job or cluster of jobs is the student prepared for by the program?

3. What are the implications of your program for technical and general education programs at the two-year college?

## IV. General Question

1. What are the general purposes or objectives of your program?

2. What changes in two-year college philosophy and practice would help your institution and your program better meet their goals?

(Similar questionnaires were sent to chairmen of the departments of electrical technology, secretarial and distributive education programs in selected high schools).

# APPENDIX B

## QUESTIONNAIRE PARTICIPANTS

## APPENDIX B

## QUESTIONNAIRE PARTICIPANTS

### COMMUNITY COLLEGES

Adirondack Community College at Hudson Falls
Auburn Community College at Auburn
Borough of Manhattan Community College at New York City
Bronx Community College at New York City
Cazenovia College at Cazenovia
Corning Community College at Corning
Dutchess Community College at Poughkeepsie
Erie County Technical Institute at Buffalo
Fulton-Montgomery Community College at Johnstown
Hudson Valley Community College at Troy
Jamestown Community College at Jamestown
Jefferson Community College at Watertown
Junior College of Albany at Albany
Kingsborough Community College at Brooklyn
Mohawk Valley Community College at Utica
Monroe Community College at Rochester
Nassau Community College at Garden City
New York City Community College at Brooklyn
Niagara County Community College at Niagara Falls
Onondaga Community College at Syracuse
Orange County Community College at Middletown
Queensborough Community College at New York City
Rockland Community College at Suffern
Staten Island Community College at New York City
Suffolk County Community College at Selden
Sullivan County Community College at South Fallsburg
Ulster County Community College at Kingston
Voorhees Technical Institute at New York City
Westchester Community College at Valhalla

### AGRICULTURAL AND TECHNICAL COLLEGES (Two-Year)

Agricultural and Technical College at Canton
Agricultural and Technical College at Cobleskill
Agricultural and Technical College at Delhi
Agricultural and Technical College at Farmingdale
Agricultural and Technical College at Morrisville

### HIGH SCHOOLS

| | |
|---|---|
| Brooklyn Technical High School | Brooklyn |
| New Utrecht High School | Brooklyn |
| Thomas Jefferson High School | Brooklyn |
| Samuel Gompers Vocational Technical H.S. | New York City |
| Yorkville Vocational High School | New York City |
| Benjamin Franklin High School | New York City |
| William Howard Taft High School | Bronx |
| Christopher Columbus High School | Bronx |
| James Monroe High School | Bronx |

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|---|---|
| Long Island City High School | Long Island City |
| Erie BOCES 1 | Buffalo |
| Hutchinson Central-Technical High School | Buffalo |
| Edison Technical and Industrial H.S. | Rochester |
| Utica Free Academy | Utica |
| Sewanhaka High School | Floral Park |
| East Meadow School System, W. Trasper Clarke | East Meadow |
| Ralph R. McKee Vocational and Technical H.S. | Staten Island |
| Huntington High School | Huntington |
| Division Avenue High School | Levittown |
| North Tonawanda High School | N. Tonawanda |
| Amherst Central High School | Buffalo |
| Central Islip High School | Central Islip |
| Bethlehem Central High School | Delmar |
| Dunkirk High School | Dunkirk |
| Gloversville High School | Gloversville |
| Herkimer High School | Herkimer |
| Ithaca High School | Ithaca |
| Mamaroneck High School | Mamaroneck |
| Massena High School | Massena |
| Middletown High School | Middletown |
| Oceanside High School | Oceanside |
| Tappan Zee High School | Orangeburg |
| Roslyn High School | Roslyn |
| Valley Stream North High School | Valley Stream |
| Nottingham High School | Syracuse |
| Troy High School | Troy |
| Spring Valley Senior High School | Spring Valley |
| Andrew Jackson High School | Queens |

# APPENDIX - C

## THE CONFERENCE

## APPENDIX C

## TECHNICAL EDUCATION ARTICULATION CONFERENCE

Center for Urban Education
Greyston Conference Center, Riverdale, New York
October 20-22, 1966

## PROGRAM

### Thursday, October 20, 1966

9:00 - 10:00 a.m. Registration
Coffee

10:00 - 11:45 a.m. **Conference Orientation**

STATE COMMENTS

Alan G. Robertson, Chief, Bureau of Occupational Education Research, New York State Education Department.

CUE COMMENTS

Mortimer Kreuter, Associate Professor of Education, Teachers College, Columbia University, and Assistant Director, Special Educational Practices Division of the Center for Urban Education.

CONFERENCE PROCEDURES

Michael Brick, Associate Professor of Higher Education, Teachers College, Columbia University, and Conference Coordinator.

12:00 - 1:30 p.m. Luncheon Recess

1:30 - 3:00 p.m. **First Conference Session**

Topic: ARTICULATION ISSUES IN VOCATIONAL-TECHNICAL EDUCATION.

Sebastian V. Martorana, Executive Dean for Two-Year Colleges, State University of New York.

Lucien Lombardi, Chief, Bureau of Technical Institutes, State Department of Education, Hartford, Connecticut.

3:00 - 3:15 p.m. Coffee

3:15 - 4:30 p.m. Delegate Discussions

Note: See assignments for discussion groups for conference sessions.

4:30 - 5:00 p.m. Discussion Group Chairman Reports

6:00 - 7:30 p.m. Dinner

7:45 - 9:30 p.m. Second Conference Session

Topic: ARTICULATION ISSUES (Continued)

Case Study--Articulation Issues in Secretarial Programs in High Schools and Two-Year Colleges by Emory W. Rarig, Jr., Research Associate, Center for Community Colleges, Teachers College, Columbia University, New York, New York.

Case Study--A New Approach to Curriculum Construction for Vocational-Technical Curricula, by Angelo C. Gillie, Associate Professor, Department of Vocational-Technical Education, Graduate School of Education, Rutgers - The State University, New Brunswick, New Jersey.

Friday, October 21, 1966

8:00 - 9:00 a.m. Breakfast

9:00 - 10:45 a.m. Third Conference Session

Topic: CURRICULUM AND INSTRUCTION IN VOCATIONAL AND TECHNICAL EDUCATION.

Gordon Van Hooft, Chief, Bureau of Secondary Curriculum Development, New York State Education Department.

Donald H. Smith, Dean of Curriculum and Instruction, Monroe Community College, Rochester, New York.

10:45 - 12:00 Noon Delegate Discussions

12:00 - 12:30 p.m. Discussion Group Chairman Reports

12:30 - 1:30 p.m. Luncheon Recess

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|---|---|
| 1:30 - 3:00 p.m. | Fourth Conference Session |
| | Topic: TECHNICAL MANPOWER IN NEW YORK STATE. |
| | Charles A. Pearce, Director of Research, Department of Labor, State of New York. |
| 3:00 - 3:15 p.m. | Coffee |
| 3:15 - 3:45 p.m. | Delegate Discussions |
| 4:45 - 5:00 p.m. | Discussion Group Chairman Reports |
| 5:00 - 6:00 p.m. | Recess |
| 6:00 - 7:00 p.m. | Dinner |
| 7:30 - 9:30 p.m. | Fifth Conference Session |
| | Topic: Case Study: THE CITY UNIVERSITY OF NEW YORK AND ITS ATTEMPTS AT ARTICULATION. |
| | E. K. Fretwell, Executive Dean for Academic Development, City University of New York. |

### Saturday, October 22, 1966

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|---|---|
| 8:00 - 9:00 a.m. | Breakfast |
| 9:00 - 10:30 a.m. | Sixth Conference Session |
| | Topic: THE STUDENT |
| | Leon Cohen, Dean of Students, Borough of Manhattan Community College, New York City. |
| | James Moore, Chief of the Bureau of Guidance, New York State Education Department. |
| 10:30 - 10:45 a.m. | Coffee |
| 10:45 - 12:00 Noon | Delegate Discussions |
| 12:00 - 12:30 p.m. | Discussion Group Chairman Reports |
| 12:30 - 1:30 p.m. | Luncheon and Closing Remarks |
| | Conference Adjournment |

# APPENDIX - D

## THE CONFERENCE PARTICIPANTS

# APPENDIX D

# TECHNICAL EDUCATION ARTICULATION CONFERENCE

Greyston Conference Center
Riverdale, New York

October 20-22, 1966

## CONFERENCE PARTICIPANTS

### Discussion Group Leaders:

Group I - Bernard F. Corbman, Chairman, Business Education Department, Bronx Community College, Bronx, New York.

Group II - Nathan Goldfarb, Director, Computer Center, Hofstra University, Hempstead, Long Island, New York.

Group III - Louis B. Lambert, Research Associate, Electronics Research Laboratories, Columbia University, New York, New York.

Group IV - John E. Zott, Jr., Chairman, Vocational and Technical Education, Sewanhaka High School, Floral Park, New York.

### Delegates:

BARNETT, Lawrence J. - Senior Staff Associate, Center for Urban Education, New York, New York

BRICK, Michael - Conference Coordinator. Associate Professor of Higher Education, and Associate Director, Center for Community Colleges, Teachers College, Columbia University.

CICHON, Albert J. - Instructor in Business, Mamaroneck Senior High School, Mamaroneck, New York.

COHEN, Leon - Dean of Students, Borough of Manhattan Community College, New York, New York.

CONOVER, Hobart - Chief, Bureau of Business and Distributive Education, New York State Education Department, Albany, New York.

DAVIES, Alfred - Associate in Trade and Technical Education, New York State Department of Education, Albany, New York.

FENNINGER, William - Executive Secretary, American Technical Education Society, Delmar, New York.

FORBES, Marion A. - Professor, Mechanical Technology, Broome Technical Community College, Binghamton, New York.

Delegates (Continued)

FRETWELL, E. K. - Dean for Academic Development, City University of New York, New York.

GILLIE, Angelo C. - Associate Professor, Department of Vocational-Technical Education, Rutgers - The State University, New Brunswick, New Jersey.

GOULD, E. Noah - Associate in Continuing Education Curriculum, Bureau of Continuing Education Curriculum, State Education Department, Albany, New York.

GRADONI, E. John - Supervisor, Distributive Education, New York State Education Department, Albany, New York.

PRATT, Arden - Consultant for Two-Year Colleges, State Education Department, Albany, New York.

GRUBER, Joseph - Director, Business and Distributive Education, City of New York, Board of Education, Brooklyn, New York.

HARKNESS, Peter T. - Research Consultant, Occupational Education, New York State Department of Education, Albany, New York.

HAY, Earl - Associate in Secondary Curriculum Development, New York State Department of Education, Albany, New York.

HENDERSON, John - Assistant to the Executive Dean for Two-Year Colleges, State University of New York, Albany, New York.

HERSHEY, Harold W. - Department Head, Metal Trades, Edison Technical and Industrial High School, Rochester, New York.

HUNTER, Robert - Associate in Trade and Technical Education, New York State Education Department, Albany, New York.

JOSEPH, Mrs. Hanna - Director, Business Education, Board of Education, Syracuse, New York.

KORMAN, Samuel - Research Associate, Electronics Research Laboratories, Columbia University, New York, New York.

KREUTER, Mortimer - Associate Professor of Education, Teachers College, Columbia University, and Assistant Director, Special Educational Practices Division, Center for Urban Education.

MARTORANA, S. V. - Executive Dean for Two-Year Colleges, State University of New York, Albany, New York.

McGRATH, James - Assistant Dean, New York City Community College, Brooklyn, New York.

MOORE, James - Chief, Bureau of Guidance, New York State Education Department, Albany, New York.

Delegates (Continued)

LOMBARDI, Lucien - Chief, Bureau of Technical Institutes, State Department of Education, Hartford, Connecticut.

OLIVO, C. Thomas - Director of Industrial Education, New York State Department of Education, Albany, New York.

OLIVERIO, Mary Ellen - Professor of Economic Education, Teachers College, Columbia University, New York, New York.

OLSEN, William O. - Chairman, Related Technical Subjects, Alfred E. Smith Technical High School, Bronx, New York.

PEARCE, Charles A. - Director of Research, Department of Labor, State of New York, New York, New York.

PULHAMUS, William R. - Chairman, Electrical Department, Mohawk Valley Community College, Utica, New York.

RARIG, Emory W., Jr. - Research Associate, Center for Community Colleges, Teachers College, Columbia University, New York, New York.

ROBERTSON, Alan G. - Chief, Bureau of Occupational Education Research, New York State Education Department, Albany, New York.

RUBIN, Alvin - Associate in Secondary Curriculum Development, New York State Education Department, Albany, New York.

SLADE, Irving L. - Project Coordinator, Operation Bridgeheads, City University of New York, New York, New York.

SMITH, Donald H. - Dean of Curriculum and Instruction, Monroe Community College, Rochester, New York.

VAN HOOFT, Gordon - Chief, Bureau of Secondary Curriculum, New York State Education Department, Albany, New York.

WHITCRAFT, John - Director of General Occupational Education, New York State Education Department, Albany, New York.